



**INTERPROVINCIAL CROSSINGS
ENVIRONMENTAL
ASSESSMENT**



**ÉVALUATION
ENVIRONNEMENTALE DES
LIAISONS INTERPROVINCIALES**

Interprovincial Crossings Environmental Assessment Study

Summary Report

Final Report

January 5, 2009



EXECUTIVE SUMMARY.....	E-I
1.0 INTRODUCTION	1
1.1 Purpose of the Undertaking.....	1
1.2 Terms of Reference Document	2
1.3 Project Organization	2
1.4 Study Area.....	5
1.5 Background	6
1.6 Growth Challenges in Canada’s Capital Region.....	7
2.0 NEED AND JUSTIFICATION.....	8
3.0 ANALYSIS AND EVALUATION PROCESS.....	11
3.1 Assessment of Alternative Planning Solutions	11
3.2 Regional Screening Analysis of Candidate Areas for Future Crossings	11
4.0 TRANSPORTATION	18
4.1 Traffic Analysis.....	18
4.1.1 Forecast Demand	18
4.2 Transit.....	22
4.3 Truck Analysis.....	24
4.4 Technology Screening.....	25
4.4.1 Ferry Alternatives.....	26
4.4.2 Tunnel Alternatives.....	26
5.0 EXISTING ENVIRONMENTAL CONDITIONS	28
6.0 PUBLIC CONSULTATION	29
6.1 PCS 1 (Spring 2007).....	32
6.2 PCS 2 (Winter 2008).....	33
6.3 PCS 3 (Spring 2008).....	34
6.4 PCS 4 (Fall 2008)	36
6.5 Media Briefings.....	38
7.0 FIRST NATIONS CONSULTATION	39
8.0 EVALUATION OF CROSSING ALTERNATIVES	40
9.0 DETAILED EVALUATION OF ALTERNATIVES	41
9.1 Evaluation Criteria	41
9.2 Weighting of the Factors and Sub-factors	45
9.2.1 Traffic and Transportation	47
9.2.2 Natural Environment	50
9.2.3 Cultural Environment.....	53
9.2.4 Water Use and Resources	55
9.2.5 Socio-Economic Environment.....	57
9.2.6 Land Use and Property	59
9.2.7 Cost.....	61

9.2.8	Summary of Alternative Ratings	63
9.3	Sensitivity Testing	65
9.3.1	Summary of Sensitivity Testing	74
9.4	Alternative Ranking Summary	77
9.5	Findings of the Evaluation	79
10.0	CONCLUSIONS	80
10.1	Study Conclusions.....	80
10.2	Addressing Policy Targets	81
10.3	Study Issues	83
10.4	Recommended Plan.....	88
10.5	Recommended Project.....	88
10.6	Canadian Environmental Assessment Act	89
	GLOSSARY OF TERMS.....	97

List of Figures

Figure 1	Project Organization Chart.....	3
Figure 2	Study Area	5
Figure 3	Regional Study Area.....	14
Figure 4	Long List of Conceptual Corridor Crossings	15
Figure 5	Short Listed Corridors.....	17
Figure 6	2031 Traffic Demand a.m. Peak Hour	21
Figure 7	Number of Trucks/Day Forecast at Each Crossing (2031) (Two-way Travel).....	25
Figure 8	Evaluation Committee Weights	45
Figure 9	Ranking of Alternatives	46
Figure 10	Traffic and Transportation Weights	47
Figure 11	Results of the Traffic and Transportation Weighted Scores.....	49
Figure 12	Natural Environment Sub-factor Weights.....	51
Figure 13	Results of the Natural Environment Weighted Scores.....	52
Figure 14	Cultural Environment Sub-factor Weights.....	53
Figure 15	Results of the Cultural Environment Weighted Scores.....	54
Figure 16	Water Use and Resources Sub-factor Weights.....	55
Figure 17	Results of the Water Use and Resources Weighted Scores.....	56
Figure 18	Socio-Economic Environment Sub-factor Weighted Scores.....	57
Figure 19	Results of the Socio-Economic Weighted Scores	58
Figure 20	Land Use and Property Sub-factor Weighted Scores.....	59
Figure 21	Results of the Land Use and Property Weighted Scores.....	60
Figure 22	Cost Sub-factor Weighted Scores.....	61
Figure 23	Results of the Cost Weighted Scores	62
Figure 24	Summary of Weighted Scores	64

Figure 25 Recommended Integrated Sustainable Planning	82
Figure 26 Kettle Island (Corridor 5) North Section	90
Figure 27 Kettle Island (Corridor 5) River Section.....	91
Figure 28 Kettle Island (Corridor 5) South Section.....	92
Figure 29 Kettle Island 2031 a.m. Differential Traffic Forecasts.....	93
Figure 30 Kettle Island 2031 Daily Differential Commercial Vehicles	94
Figure 31 2031 Regional a.m. Peak Hour Traffic Distribution Forecasts	95
Figure 32 2031 Regional Daily Commercial Vehicle Distribution Forecasts	96

List of Tables

Table 1 Alternative Planning Solutions.....	13
Table 2 Previous (2002) and Forecast (2021) Person Trips - p.m. Peak Hour, Peak Direction	18
Table 3 2031 Forecast Person Trips for a.m. Peak Hour, Peak Direction Interprovincial Screenline.....	20
Table 4 Summary of Tunnel Feasibility Analyses.....	27
Table 5 Public Consultation Group Participants.....	30
Table 6 Summary of Comments - Ranking of Topics of Interest.....	36
Table 7 Averaged Evaluation Committee Weight and Summary of Weighted Scores.....	66
Table 8 Sensitivity Test No. 1 and 2 Traffic and Transportation - High and Low Tests	67
Table 9 Sensitivity Test No. 3 and 4 Natural Environment - High and Low Tests	68
Table 10 Sensitivity Test No. 5 and 6 Cultural Environment - High and Low Tests	69
Table 11 Sensitivity Test No. 7 and 8 Water Use and Resources - High and Low Tests.....	70
Table 12 Sensitivity Test No. 9 and 10 Socio-Economic Environment - High and Low Tests	71
Table 13 Sensitivity Test No. 11 and 12 Land Use and Property - High and Low Tests.....	72
Table 14 Sensitivity Test No. 13 and 14 Costs - High and Low Tests	73
Table 15 Summary of Sensitivity Tests.....	75
Table 16 Concluding Study Issues	83

Executive Summary

The purpose of this undertaking is to complete an environmental assessment (EA) that evaluates existing and projected interprovincial transportation capacity in the National Capital Region (NCR) and to determine a strategic plan to address supply needs. The federal, Ontario, and Quebec governments have recognized that deficiencies in the existing system are negatively affecting the overall quality of life for residents of Ottawa and Gatineau. These negative effects include increasing auto emissions and idling due to traffic slowdowns as well as delays in the movement of people and goods between the two cities.

Past transportation studies (1994 JACPAT and 1999 Interprovincial Transportation Study) have concluded that as the NCR continues to grow, traffic conditions will continue to worsen unless a concerted effort is made to make the best use of existing infrastructure, to improve the capacity of the interprovincial system, and to add more routes for heavy trucks. This study concludes that a new interprovincial crossing of the Ottawa River is the best solution.

The EA was divided into two phases. The scope of Phase 1, the subject of this report, was to ascertain the need for additional interprovincial capacity (new crossing locations), propose solutions if necessary, evaluate these alternatives, and prioritize the solution(s). Phase 2 will complete the EA and recommend measures to reduce negative environmental effects and obtain appropriate approvals.

Phase 1 identified a number of alternative planning solutions, including a new crossing. Other elements of the plan include transit initiatives to increase ridership, transportation system management (TSM) measures (such as improving existing infrastructure), and transportation demand management (TDM) measures to increase walking and cycling options. After initially evaluating proposed solutions, the study assessed design alternatives (described in this report as “alternatives”) such as bridge, tunnel, or ferry crossings.

During the preparation of the Terms of Reference, a preliminary short list of alternatives was identified. This short list of eight wide-band corridors (wide areas where a crossing was to be considered) was presented to the public for comment at the first of several public consultation sessions (PCS's) in June 2007. From this input, two corridors were added to the short list of alternatives to be subjected to detailed environmental investigations.

Additional analyses determined that the ferry alternatives would not meet the future traffic needs of the NCR. The assessment of tunnel options found that the river depth, distance, and connecting links were feasible for two corridors. The bridge alternative was found to be feasible at all crossing locations.

The Study Team then narrowed down the selection process by using constraint mapping to identify possible restrictions. The findings were then carried forward to an in-depth evaluation that has resulted in a recommended east-end crossing at Corridor 5, located at Kettle Island.

Phase 1 of the EA included comprehensive public consultation with a Public Consultation Group (made up of local residents and community groups) and four PCS's. The methods of communication included newspaper advertisements, a public website, and a mailing list for emails and mail-out notification. In addition, communication and consultation has taken place between the federal government and Algonquin First Nations to lay the groundwork for a dialogue on the need for the project, with a commitment to future discussions.

External agency consultation included a Technical Advisory Committee made up of municipal, provincial, and federal agencies. This group provided technical feedback throughout the study.

Study Recommendations

The transportation plan described by this EA addresses the need for a new east Ottawa River crossing within the next 20

years. The Kettle Island crossing (Corridor 5) is the recommended site for a new interprovincial crossing. Phase 2 of the EA will assess the Kettle Island Crossing as part of the “Recommended Plan” (to be described as the “Project”).

The plan also provides direction for municipalities to allocate and protect potential future crossings currently under public ownership or protected under existing land-use designations. No west-end crossing has been recommended to be carried forward for Phase 2 of the EA.

The Evaluation Committee’s weighting prioritized the Kettle Island corridor (Corridor 5) as the best balanced solution of a total of 12 considered alternatives. The results of the evaluation clearly demonstrate this alternative had the best ability to meet the transportation objectives of the study while minimizing the overall environmental effects. This technical analysis was presented to the public for comments at PCS 4, held September 23 and 24, 2008.

The proposed technical work program and a preliminary Phase 2 Study Design will be presented to the public at PCS 5 (the first to be scheduled in Phase 2). The Phase 2 technical work program will be in accordance with the federal EA process but will consider provincial requirements. It will assess the impact of implementing Corridor 5, including measures to reduce environmental effects, and report to the public on these results.

Major features of the Recommended Plan include:

- Modifications to the Aviation Parkway / Highway 417/Ottawa Road 174 (split) interchange;
- Widening of the Aviation Parkway, where necessary, to a 4-lane divided cross-section;
- Construction of a new intersection with the Rockcliffe Parkway;
- A new interprovincial bridge with long spans (approximately 200 m) over the navigational channel;
- A new roadway link northerly from the bridge to Maloney Boulevard; and

- Widening of Montée Paiement over Autoroute 50 to a four-lane structure.

The Recommended Plan is shown on **Figures 26 to 28** of this report. Phase 2 of the EA is anticipated to be completed in approximately 30-36 months.

The traffic network changes from the new crossing will result in a more effective and efficient movement of people and goods. **Figures 29 and 30** present the 2031 forecast of traffic that will be attracted to the new crossing (illustrated in red) and the locations from which this traffic will be relocated (illustrated in green). **Figure 29** presents the morning peak hour traffic forecasts and **Figure 30** illustrates daily commercial vehicles. **Figures 31 and 32** present the regional morning peak hour traffic distribution and daily commercial vehicle forecasts, respectively, for a new crossing at Kettle Island.

Based on the Phase 1 technical analyses, the study recommends a “basket” of solutions to be carried forward as the Recommended Plan to meet forecast growth of the community, including:

- interprovincial transit initiatives to increase ridership and increase transit mode share (transit versus car use) so that the majority of new trips can be accommodated by transit;
- transportation demand management (TDM) measures to increase walking and cycling, including sidewalks and bike lanes on the new crossing and investigation of other pedestrian and cycling facilities in the downtown, such as the Prince of Wales Bridge;
- transportation system management (TSM) measures to improve the efficiency of the existing infrastructure, such as making the best use of the Chaudière bridge;
- supporting land-use policies to promote intensification and redevelopment strategies in the urban area as described in the Official Plans of Gatineau and Ottawa;
- future corridor protection by municipalities of lands that are currently under public ownership or protected

under existing land-use designations to provide flexibility for future crossings;

- With a new crossing in place a commercial vehicle planning study to review interprovincial crossings and the ability to meet forecast demand; and
- continuation of the study to Phase 2 to assess in detail Corridor 5, Kettle Island, for a new interprovincial crossing.

1.0 INTRODUCTION

The National Capital Commission (NCC), the Ontario Ministry of Transportation (MTO) and the ministère des Transports du Québec (MTQ) carried out Phase 1 of a two-phase, federal environmental assessment (EA) of the current and projected need for interprovincial crossings in the National Capital Region (NCR). This EA was undertaken in cooperation with the Ville de Gatineau, the City of Ottawa, and in consultation with government agencies and the general public.

The purpose of this study is to complete an EA that evaluates existing and projected deficiencies in interprovincial transportation capacity in the NCR to determine a strategic plan to address supply needs. The federal, Ontario, and Quebec governments have recognized that existing interprovincial transport deficiencies are negatively affecting the movement of people and goods between Ottawa and Gatineau.

The EA is being conducted in two Phases: Phase 1 has documented the need and justification for infrastructure improvements and assessment of several different solutions, technologies, and corridors. This technical assessment has resulted in a Recommended Plan that includes a new interprovincial crossing at Kettle Island. A future Phase 2 study will assess in greater detail the potential effects for the selected corridor and recommend measures to reduce these to meet federal, provincial, and municipal legislation requirements and obtain appropriate approvals.

1.1 PURPOSE OF THE UNDERTAKING

The purpose of this undertaking is to improve interprovincial transportation capacity across the Ottawa River to address long-term needs. The undertaking has the following objectives:

- To enhance the quality of life for residents in the NCR;
- To reduce peak hour congestion across the Ottawa River screenline – an imaginary division used to measure traffic volume and capacity – and achieve a specific level of service (LOS D)¹ ;
- Enhance the regional economy;
- Provide provincial–municipal highway connections;
- Link existing truck routes;
- Provide high mobility and accommodate all modes of travel;
- Complement transit objectives and plans;
- Minimize natural, socio-economic, and cultural impacts; and
- Maximize societal benefits.

¹ Level of service (LOS) is a qualitative measure that describes the operational characteristics of a transportation facility. LOS is typically expressed as a value ranging from LOS "A" (indicates a superior operation) to LOS "F" (indicates a very poor operation or breakdown conditions). The LOS ratings are based on factors specific to the transportation element being assessed and may include speed, travel time, manoeuvrability, delays, traffic interruptions, and safety.

1.2 TERMS OF REFERENCE DOCUMENT

A Terms of Reference (ToR) report (which was not a formal Province of Ontario ToR) described the general procedures and processes that guided the EA activities. This document coordinated the specific requirements of both federal and provincial environmental legislation early in the process. The ToR report provided a blueprint of all study activities to allow the public to understand its purpose and methods. At the start of the study, the coordinated EA process was designed to be sufficiently flexible to allow for potential modifications, to respond to public input, and to address federal and provincial legislative requirements.

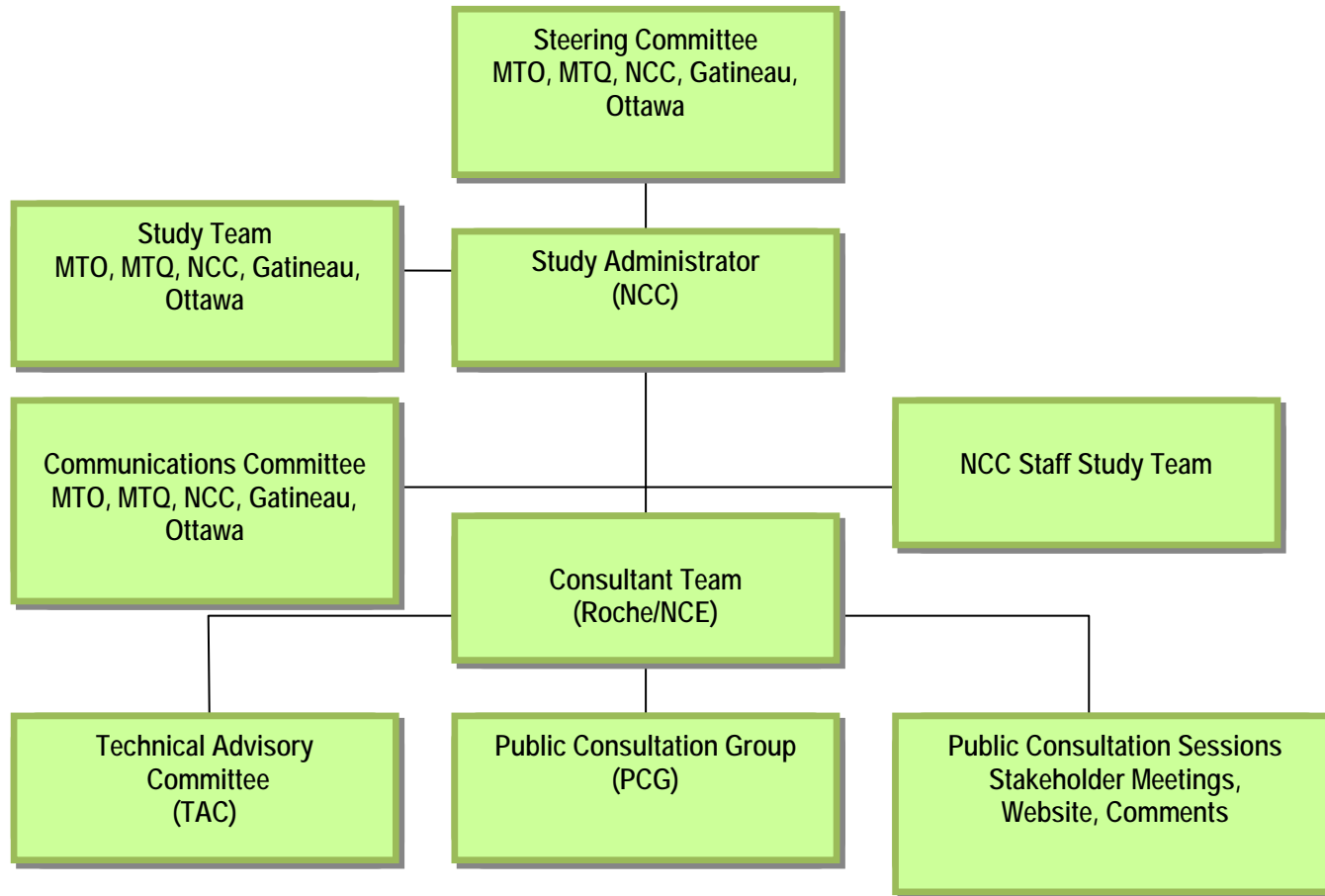
1.3 PROJECT ORGANIZATION

Phase 1 of this EA was led by a Steering Committee, including a partnership of the National Capital Commission (NCC), the Ontario Ministry of Transportation (MTO), and the ministère des Transports du Québec (MTQ), with the collaboration of the Ville de Gatineau and the City of Ottawa. It was guided by the Study Team consisting of the funding partners and the cities of Ottawa and Gatineau. The overall study organization is illustrated in **Figure 1**, Project Organization Chart.

The project organization chart depicts the working relationships between various subgroups responsible for or participating in this study. Their roles are described here:

- The Steering Committee provided oversight for the study and advice to decision-makers.
- NCC Study Administrator managed the consultant's work and ensured that work met the requirements of the study funding partners (NCC, MTO, and MTQ).
- The Study Team provided technical and policy guidance during critical stages of the work.
- NCC in-house experts provided guidance as well as technical and administrative support during the course of the study.
- The Communications Committee provided media liaison throughout the course of the study.
- ROCHE/NCE coordinated and executed day-to-day technical activities.

Figure 1
Project Organization Chart



The public consultation process included the following:

- Public consultation sessions where the public at large provided input and was invited to comment on the study progress at key study milestones. (Refer to **Section 6.0** for a summary of each session.);
- Input from the Public Consultation Group (PCG), which comprised representatives from community organizations directly concerned with the interprovincial crossings. (Refer to **Table 5** for a listing of associations.); and
- The Technical Advisory Committee (TAC), made up of experts from numerous agencies, including provincial ministries, municipal staff, conservation authorities, and federal authorities. The TAC was established to provide an opportunity to exchange information with the Study Team throughout the study. TAC meetings were held to coincide with the key study stages. Additional meetings and discussions with individual regulatory agencies were held throughout the study to address specific issues.

TAC members include the following:

Federal

- National Capital Commission
- Canadian Environmental Assessment Agency
- Parks Canada
- Department of Fisheries and Oceans
- Public Works and Government Services Canada
- Transport Canada
- Environment Canada

Province of Ontario

- Ministry of Transportation
- Ministry of the Environment
- Rideau Valley Conservation Authority
- Ministry of Natural Resources
- Ministry of Culture
- Mississippi Valley Conservation Authority

Province of Quebec

- Ministère des Transports
- Ministère du Développement durable, de l'Environnement et des Parcs
- Ministère des Ressources naturelles et de la Faune
- Hydro Québec

City of Ottawa

- OC Transpo

Ville de Gatineau

- Société de transport de l'Outaouais (STO)

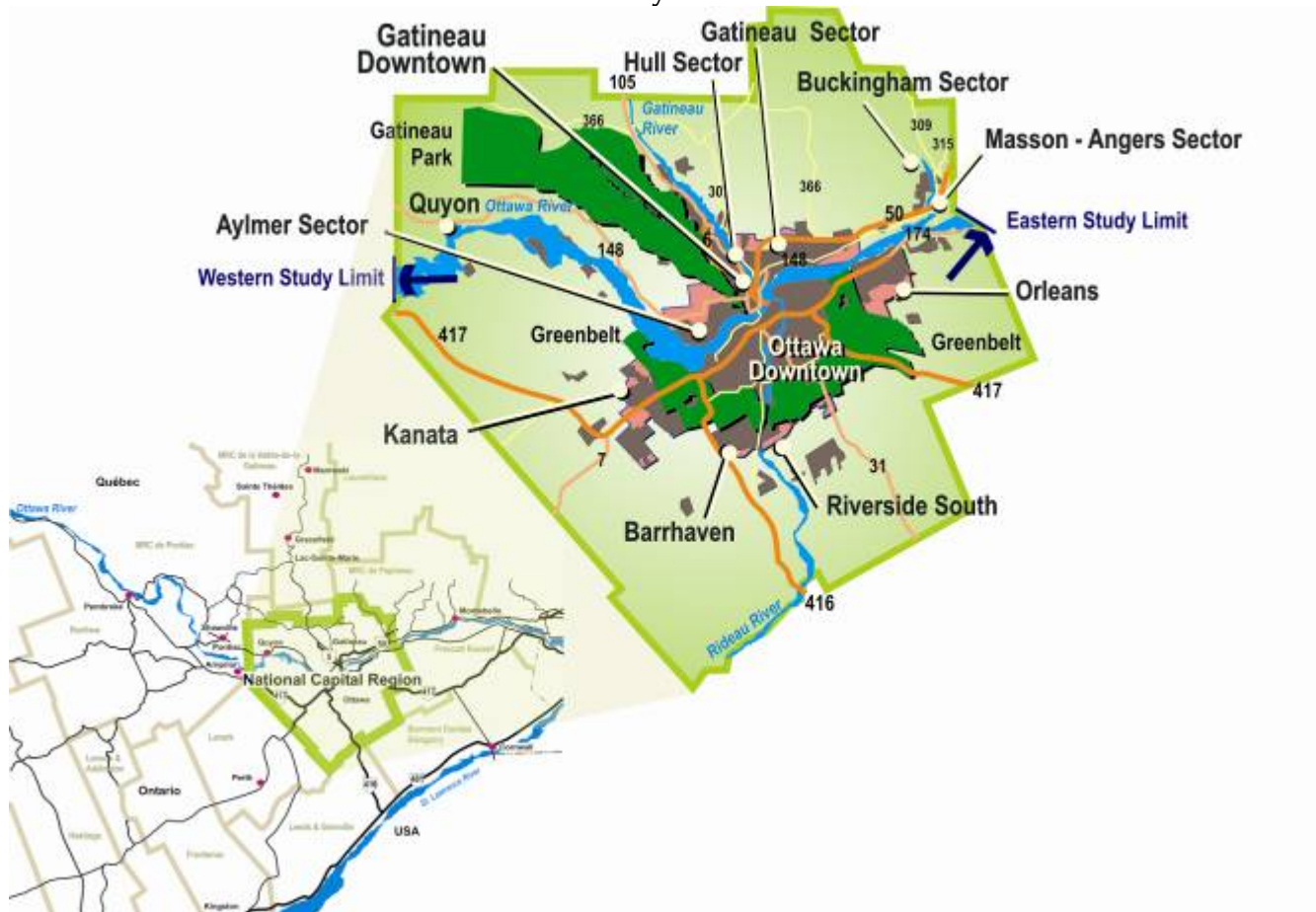
Other Agencies

- Transport 2000
- Conseil régional de l'environnement et du développement durable de l'Outaouais (CREDDO)

1.4 STUDY AREA

The overall study area for the EA is the NCR, including the municipalities of Ottawa, Ontario and Gatineau, Quebec, as shown in **Figure 2, Study Area**.

**Figure 2
Study Area**



1.5 BACKGROUND

The NCR consists of many communities that, while culturally and economically distinct, share many attributes such as recreational facilities and employment opportunities. The NCR's transportation system accommodates interprovincial travel to these facilities.

Currently, people and goods move across the Ottawa River between Ottawa and Gatineau by means of five vehicular bridges and two ferries. The bridges are located primarily in the central part of the NCR with goods moving across two bridges designated as truck routes, the Chaudière and Macdonald-Cartier bridges. The ferries are located at Quyon and Masson-Cumberland. The last new crossing was constructed in the early 1970s, and there has been limited change in traffic capacity across the Ottawa River since that time, while population and demand have grown significantly.

Travel across the Ottawa River is constrained by limited crossing capacity at the existing bridges and by their respective approach routes. This constraint has led to congestion, with the bridges operating at an LOS F (breakdown or forced flow) during peak hours. While growth in population, employment and tourism activity has occurred and is forecast to continue, there have been only marginal increases in crossing capacity in the last 35 years. The most recent capacity increase was the introduction of a reversible high occupancy vehicle (HOV) lane on the Champlain Bridge in 2000. In recent decades, significant efforts have focussed on improving the transit system. These efforts have resulted in an increase in transit use, which has led to a transit modal split (the split of motorized trips, i.e. transit versus car trips) from 16 percent in 2001 to 23 percent in 2005. However, the demand for interprovincial travel continues to exceed the available capacity of the bridges during peak hours.

Two previous studies have considered the transportation needs for interprovincial travel in the NCR. The 1994 Joint Administrative Committee on Planning and Transportation (JACPAT) Study of Interprovincial Bridges in the National Capital Region², and the 1999 Interprovincial Transportation Concept Plan, conducted jointly by the NCC, the former Communauté urbaine de l'Outaouais and the former Regional Municipality of Ottawa-Carleton (RMOC), concluded that additional crossing capacity will be required to accommodate forecasted growth in the movement of people and goods in the NCR.

The 1999 Interprovincial Transportation Concept Plan³ examined historical growth in the NCR over the last century and recognized increased growth and outward expansion of the geographic urban area. The Concept Plan recommended that crossing corridors should be protected in the east and west ends of the NCR to accommodate these growth areas.

² *Study of the Interprovincial Bridges in the National Capital Region, Phase 2 (Synthesis, Conclusions and Recommendations)*, Final Report, November 1994, prepared by Delcan in association with Roche.

³ *Interprovincial Transportation in the National Capital Region Summary Report*, February 1999, prepared by TSH and Cartier Group.

These studies clearly identified deficiencies in interprovincial transportation infrastructure (i.e. insufficient capacity to meet travel demand) a situation which will deteriorate with continued growth in population, employment, and tourism in the NCR, unless concerted efforts are made to address the lack of capacity. The effects of travel demand exceeding the available capacity of the existing bridges will add to congestion, increase emissions, and reduce mobility, all of which affect the quality of life for residents of the NCR downtown core (Ottawa and Gatineau).

Interprovincial truck traffic also represents a major problem on the road network. Presently, 75 percent of all truck crossings currently use the Macdonald-Cartier Bridge and 25 percent use the Chaudière bridge. These are the only available interprovincial truck routes which direct the majority of truck traffic through the downtown core of Ottawa. The NCC's Strategic Transportation Initiative, White Paper, 2005, described in **Section 3.1**, supports mitigating the impacts of interprovincial heavy truck transport in the core area.

1.6 GROWTH CHALLENGES IN CANADA'S CAPITAL REGION

The population in the NCR has grown from approximately 100,000 at the turn of the last century, to 250,000 by 1945, 500,000 by 1965 and reached approximately 1 million by the year 2000. By the year 2031, the population in the NCR is forecast to exceed 1.5 million. The Portage Bridge, the last crossing constructed over the Ottawa River, was completed in the early 1970s – almost 35 years ago – despite a near doubling of the population. Since then, the only additional crossing capacity was the construction of a recent HOV lane on the Champlain Bridge.

Long-range trends suggest that the population and employment in the NCR will likely exceed current projections for 2031. It would be prudent to plan for this growth and protect potential interprovincial corridors in advance of development, for the following reasons:

- Reasonable crossing locations are controlled by physical limitations of the river.
- Identifying future corridors allows for land-use plans to be developed that can minimize effects on existing, growing, and new communities.
- Long-range planning can allow development to unfold in a manner compatible with the development of a potential transportation corridor.

2.0 NEED AND JUSTIFICATION

The NCR is currently without consensus on how to meet the present and future needs for transportation across the Ottawa River. Past planning activities have not produced a common plan for the entire capital region, and as a result, interprovincial crossings have become increasingly congested. The existing interprovincial network, with its five bridges in the NCR core, is currently at capacity during peak periods, causing delays in the movement of goods, frustration for drivers, and concerns about quality of life for communities. There is therefore an immediate need to improve the existing interprovincial transportation system and provide direction for the future.

The need and justification for a future plan is based on the following general issues:

- The existing bridges are currently congested, with no alternatives available during peak periods.
- All truck traffic is required to cross on only two centrally located bridges, resulting in circuitous travel for trucks as all goods movement must travel downtown.
- Population and employment in the NCR are expected to continue growing (by approximately 30 percent in the next 20 years) increasing travel demand and exacerbating the current capacity constraint over the Ottawa River.
- The Official Plans of the City of Ottawa and Ville de Gatineau are not protecting the same corridors for future crossings of the Ottawa River.
- Community growth will see an expansion of population outward from the downtown core where the existing bridges are located.
- The federal government is the largest employer in the NCR, and it has a policy of maintaining employment on both sides of the Ottawa River. Throughout their careers, government employees may need to move to offices in either Ottawa or Gatineau.
- Urban renewal may result in reduced capacity in one or more crossings as the number of lanes on arterial streets are removed to accommodate new neighbourhoods. For example, the King Edward Avenue corridor is being developed as a main street in Ottawa.

In addition, communities are expressing concerns over the impact of truck traffic on quality of life. If additional restrictions are placed on truck routes to accommodate these communities, it will become even more urgent to provide alternative truck routes across the Ottawa River in the near term.

Based on the June 2007 trip origin and destination survey completed as part of this study, between 30 and 40 percent of truckers making interprovincial trips would make use of new east and west bridges, if they were available, thereby reducing existing impacts on the communities in the downtown core.

Section 4.0 of this report provides further detail on projected interprovincial transportation demands.

The EA found that the need for improved interprovincial transportation is supported and justified by the following key factors:

Quality of Life: The lack of adequate crossing capacity will affect the overall quality of life for people residing along interprovincial corridors in Ottawa and Gatineau. Considerable additional time will be spent on congested roadways.

Auto Emissions: The lack of adequate capacity will increase auto emissions because of lower travel speeds and increased idling. This approach runs contrary to environmental objectives established by the municipal, provincial, and federal governments.

Delays to Persons: People travelling across the interprovincial screenline will experience considerable delays. This equates to an economic loss for Ottawa and Gatineau.⁴

Delays to Movement of Goods: Goods travelling across the interprovincial screenline will be subjected to considerable delays. This item is likely more critical than delays to persons, because of the lack of discretionary travel opportunities - vehicles moving goods in this area may not have flexibility in travel routes and times. This also means an economic loss for Ottawa and Gatineau commercial operators.⁵

Delays to Street-Level Transit: All surface transit routes along these interprovincial corridors will be subjected to delays. Additional costs may be incurred to further develop "Bus Only" lanes or other transit priority measures (beyond those identified in the City of Ottawa Transportation Master Plan (TMP) to address delays generated by on-street congestion.

Fuel Consumption: The consumption of fossil fuel will increase because of ongoing congestion on the roadways.

Tourism and Safety Impacts: The removal of some or all of the heavy vehicle traffic in Ottawa's central business district would greatly enhance the overall attractiveness and safety of roadways - a move supported by the City of Ottawa and the NCC.

Hazardous Goods: The movement of hazardous goods through the central business district is particularly problematic because of many people shop and work in this area. In addition, the circuitousness of the truck route, the number of vehicle/pedestrian conflict locations and the poor

⁴ Interprovincial Transportation in the National Capital Region (Economic Study), February 1999, prepared by TSH and Cartier Group

⁵ Interprovincial Transportation in the National Capital Region (Economic Study), February 1999, prepared by TSH and Cartier Group

roadway geometry are also concerns related to the movement of hazardous goods through the central business district.

King Edward Impacts: The reduction of heavy vehicle movements in Ottawa's central business district would reduce noise and vibration, enhance the safety and attractiveness of walking and cycling, and improve the street-level activities.

Economic Development in the NCR: Development in the NCR may be affected by the lack of adequate transportation facilities.

Resolution of these issues requires additional interprovincial crossings. The status quo is not considered a reasonable alternative.

3.0 ANALYSIS AND EVALUATION PROCESS

3.1 ASSESSMENT OF ALTERNATIVE PLANNING SOLUTIONS

One of the first steps in the study was to assess alternative planning solutions, also described as “alternatives to the undertaking” under the Ontario *Environmental Assessment Act* or “alternative means,” under the *Canadian Environmental Assessment Act*. These solutions approach the issue of interprovincial transportation from a number of different ways, taking into consideration technical, economic, and environmental impacts. The recommended alternative planning solutions are summarized in **Table 1, Alternative Planning Solutions** and were made available to the public at Public Consultation Session 2.

3.2 REGIONAL SCREENING ANALYSIS OF CANDIDATE AREAS FOR FUTURE CROSSINGS

Following the assessment of alternative planning solutions and confirmation of the need for new interprovincial infrastructure, this study identified reasonably broad corridors for new crossings. The screening criteria for these locations were affordability, feasibility, and achievement of the study objectives.

The screening analysis (qualitative evaluation) was undertaken in two steps. The initial step concluded that, within the broad regional study area (the entire NCR), certain rural areas should be removed from further consideration. This decision was taken because these areas lack the potential to attract the large volumes of traffic from downtown and are too remote to service the movement of goods. For example, trucks and cars would not travel long distances to use a crossing such as at Quyon. These rural areas are the sections of the NCR west of Kanata/Aylmer and east of Cumberland/ Masson-Angers. Refer to **Figure 3, Regional Study Area**.

The objective of the EA was to define a plan for interprovincial travel. To comply with the study objectives, new crossings should satisfy the following criteria:

- Efficiently accommodate NCR interprovincial travel demand (all modes, including pedestrians, cyclists, public transit, cars, and commercial vehicles);
- Consider quality of life and economic objectives of the communities;
- Ensure interprovincial connections between the primary provincial/municipal highway systems (freeways/expressways/arterials) in the cities of Gatineau and Ottawa;
- Provide alternative truck route(s), including the possible modification of existing routes, that could link to existing truck routes on both sides of the river;
- Minimize the effect of traffic on communities by linking to freeways, expressways, or arterial roadways and not local or collector roads unsuitable for high volumes of traffic or truck traffic;
- Provide a high mobility arterial roadway connecting to the crossing;








- Meet level-of-service objectives (LOS) D for the entire Ottawa River screenline, which will be defined as a volume equalling 85 percent of the capacity of the entire screenline;
- Complement transit objectives of the official plans of the cities of Ottawa and Gatineau;
- Consider the natural, socio-economic and environmental impacts;
- Balance transportation objectives with environmental objectives and effects; and
- Be a good societal investment (the overall benefits outweigh the costs of the undertaking).

Efforts to meet these objectives led to a basket of solutions, as described in **Section 3.1** that form the basis of a strategic interprovincial transportation plan. This plan envisions an integrated transportation system that balances sustainability with communities' quality of life.

In addition, this initial screening concluded that there are no new corridors available within the downtown core. Intensive development precludes new corridors in these areas, and existing roadway network connections would limit their capacity. Therefore, in the areas between the existing bridges (Champlain Bridge to the Macdonald-Cartier Bridge) only transportation systems/supply management improvements on the five existing crossing locations should be considered. The study also assessed the possible use of the Prince of Wales Bridge for transit or movement of freight.

The second step in the preliminary screening focused on available corridors in the east and west study areas, considered to have the highest potential to solve the transportation needs identified by this EA. The long list of crossing corridors is illustrated in **Figure 4, Long List of Conceptual Corridor Crossings**.

**Table 1
Alternative Planning Solutions**

Planning Solutions	Discussion	Recommendation	
Do Nothing (Existing transportation system is maintained)	Baseline to which other alternatives will be compared.	Carried forward for comparison purposes only.	
Transportation Demand Management (TDM)	Considered a part of an overall transportation plan but not a standalone solution to meet future interprovincial transport demand.	Carried forward as part of a "basket of solutions."	
Transit Measures	Considered a part of an overall transportation plan but not a standalone solution to meet forecast demand. A transit undertaking may be considered in the downtown core as a separate study. The Prince of Wales Bridge may be a potential crossing location for a transit initiative, as a separate undertaking. Its performance as a transit corridor and its environmental effects will be subject to a separate study.	Carried forward as part of a "basket of solutions."	
Land-use Control	Considered a part of an overall transportation plan but not a standalone solution to meet forecast demand. Measures such as land-use intensification in areas closer to the downtown core that support the goals of the provincial and municipal policies may delay the need for future improvements. However, these measures would likely not eliminate the need to plan for additional transportation capacity and more efficient interprovincial truck movement outside the core area.	Carried forward as part of a "basket of solutions."	
Transportation Systems/Supply Management (TSM)	Considered a part of an overall transportation plan but not a standalone solution to meet forecast demand. Improved efficiency, including contra-flow lanes and high occupancy vehicle (HOV) lanes etc. should be investigated as part of Phase 2 of this study on new and existing crossings.	Carried forward as part of a "basket of solutions."	
Diversion of Goods Movement to Rail	Subsequent to the initial public consultation session, a review of the feasibility of using the Prince of Wales Bridge as the undertaking was completed. This analysis has concluded that use of this bridge for freight (rail) will not replace the need for truck trips across the Ottawa River screenline. Rail infrastructure cannot attract substantial volumes of local truck traffic, due to the following: <ul style="list-style-type: none"> • Small volume of truck traffic associated with long distance hauls, and the difficulties expressed by railway operators in attempting to capture additional shipments in the Ottawa-Gatineau area; • Limited residual capacity of national railway corridors; • Need for significant freight rail infrastructure investment in both municipalities; • Longer hauling times resulting from speed regulation on some railway sections; • Division of railway market among numerous North American public and private operators; and • Preference of trucking for 'just-in-time' delivery and specific handling and packaging constraints for various shipments. 	Not carried forward as part of a "basket of solutions."	
Improvements to Existing Interprovincial Crossings	Improvements to the existing interprovincial crossings would not increase capacity in a significant way due to current constraints at downstream intersections/roadways. Additionally, improvements would not address current truck routing concerns in Ottawa's central area. However, measures such as making the best use of the Chaudière Bridge need to be included in the solutions.	Carried forward as part of a "basket of solutions."	
New Interprovincial Transportation Infrastructure	Additional crossings may provide opportunity for alternative truck routes, potentially more efficient land use and interprovincial mobility coordination, and more direct highway-to-highway linkages. This option is recommended to be carried forward for further investigation; other solutions should continue to be pursued as part of a comprehensive plan.	Carried forward as part of a "basket of solutions."	

 Recommended Planning Solution Carried Forward

Figure 3
Regional Study Area

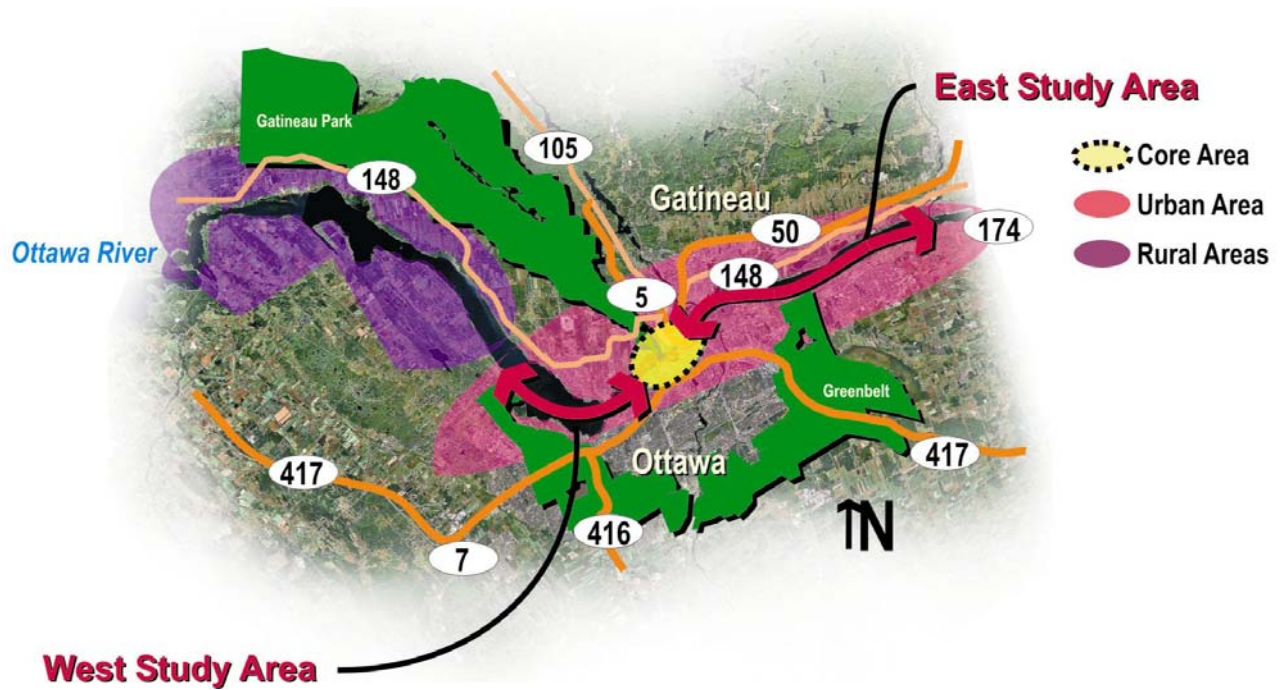
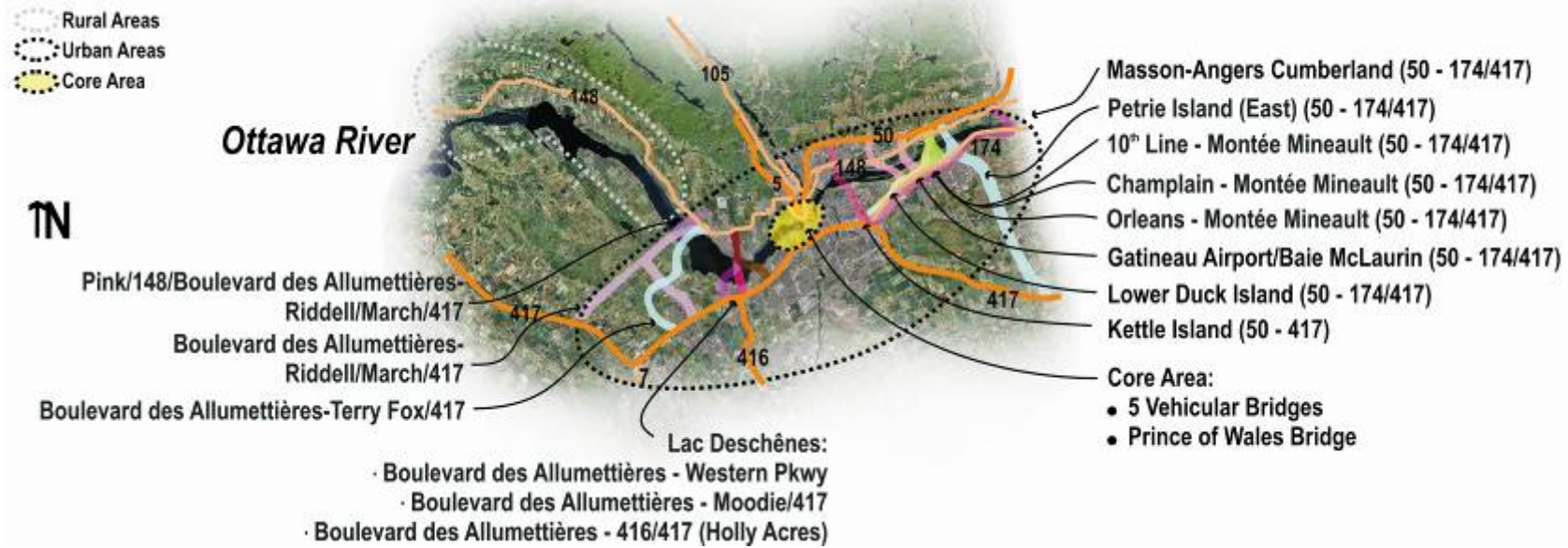


Figure 4
Long List of Conceptual Corridor Crossings



The long list of candidate corridors was prepared by reviewing all crossings identified in previous studies, through consultation with the public, and from an analysis of crossing locations that could achieve network connections on each side of the river and avoid environmentally sensitive areas. This exercise considered the following broad screening criteria:

- Transportation feasibility;
- Land use; property; social, natural, cultural, and economic environments; and
- Affordability.

Following public comment at the first public consultation session, the following two additional conceptual corridors were added for further study:

1. Pink/148/Boulevard des Allumettières – Riddell/March/417 (west study area)
2. Gatineau Airport/Baie McLaurin (50-174/417)

The two added corridors satisfy the coarse screening objectives to connect to the freeway/expressway systems via arterial roads. This screening exercise also eliminated the following corridors from further review:

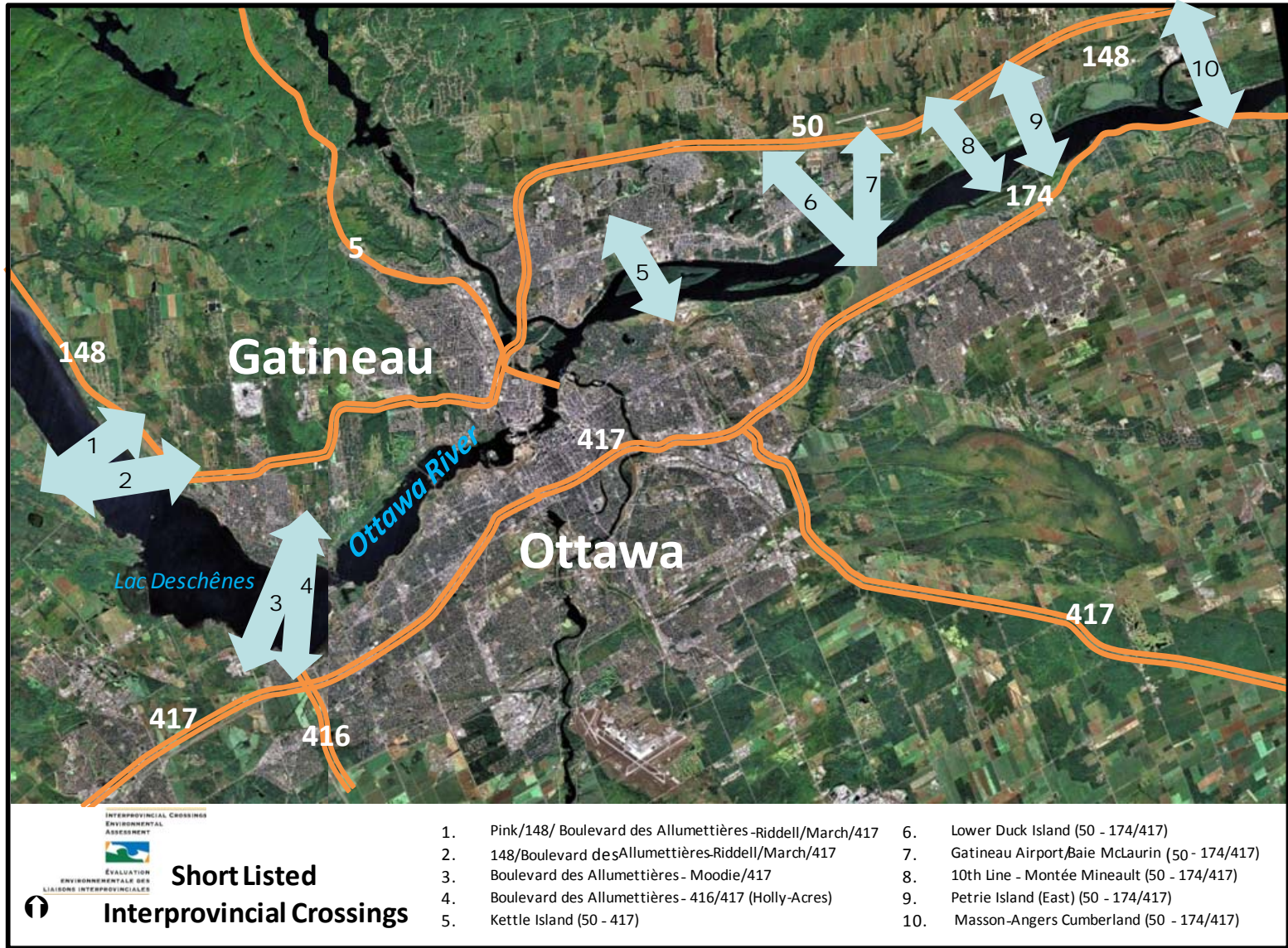
- Boulevard des Allumettières–Terry Fox Drive Extension
- Aylmer to Western Parkway
- Orleans Boulevard – Montée Mineault
- Champlain Street – Montée Mineault

The first stage of screening evaluation carried forward the following ten broadband corridors for subsequent detailed environmental inventories and analyses:

1. Corridor 1 – Pink/148/Boulevard des Allumettières – Riddell/March/417
2. Corridor 2 – Boulevard des Allumettières – Riddell /March/417
3. Corridor 3 – Boulevard des Allumettières – Moodie /417
4. Corridor 4 – Boulevard des Allumettières – 416 /417 (Holly Acres Road)
5. Corridor 5 – Kettle Island (50 –174/417)
6. Corridor 6 – Lower Duck Island (50 –174/417)
7. Corridor 7 – Gatineau Airport/Baie McLaurin (50-174/417)
8. Corridor 8 – Tenth Line – Montee Mineault (50 –174/417)
9. Corridor 9 – Petrie Island (East) (50 –174/417)
10. Corridor 10 – Masson-Anger Cumberland (50 –174/417)

The ten (10) corridors carried forward for further review are illustrated in **Figure 5, Short Listed Corridors**.

Figure 5
Short Listed Corridors



4.0 TRANSPORTATION

4.1 TRAFFIC ANALYSIS

All existing bridges are currently functioning at capacity; no additional traffic can be accommodated in the extended commuter peak hours (morning or afternoon).

In addition, capacity is affected by construction activities, collisions, disabled vehicles, inclement weather, and a variety of other factors. To appropriately evaluate available options to relieve this situation, the EA will provide careful projections of traffic demands at the ten proposed crossing locations and their approach roads.

The TRANS Committee⁶ is responsible for the development and operation of the transportation modelling activities in the NCR based on the emme/3 transportation model to quantify and distribute future demands. The emme/3 model uses 2031 population and employment forecasts as well as projected distributions and network improvements in both Ottawa and Gatineau. The model also assigns trips by mode of travel (i.e., transit, walking, cycling, and cars). In the NCR, projected demand for 2031 is based first on the premise that non-car modes of travel (e.g., transit, cycling) will increase; otherwise demand for car-based infrastructure will increase.

4.1.1 Forecast Demand

2021 Forecast Demand

The previous projections for (2021) travel demand (i.e. person trips) across the interprovincial screenline is illustrated in **Table 2, Previous (2002) and Forecast (2021) Person Trips - p.m. Peak Hour, Peak Direction**. For comparison purposes, 2002 values are also provided.

Table 2
Previous (2002) and Forecast (2021) Person Trips - p.m. Peak Hour, Peak Direction

Interprovincial Screenline								
Transit			Automobile			Total		
2002	2021	Increase	2002	2021	Increase	2002	2021	Increase
2,300	10,200	343%	11,900	18,100	52%	14,200	28,300	99%

Source: City of Ottawa Transportation Master Plan, 2003

The table illustrates a 99 percent increase in person trips across the interprovincial screenline, from 14,200 person trips in 2002 to 28,300 person trips in 2021. Transit is projected to accommodate most of the growth by increasing its mode share to not less than 36 percent of all person trips (i.e., growth of

⁶ TRANS Committee is a joint regional committee composed of the NCC, MTO, MTQ, Ottawa, Gatineau, STO and OC Transpo.

343 percent). By 2021, transit will accommodate a total of 10,200 person-trips, while cars will accommodate 18,100 person-trips.

It is evident that projected population and employment growth in Ottawa and Gatineau will result in a greater demand for interprovincial travel. Transit is considered an integral element in satisfying most of the growth in demand; however, if the transit objectives listed in **Table 2** are not achieved, the car demand across the interprovincial screenline will increase beyond those indicated values. The increased demand will significantly impair interprovincial mobility.

Current 2031 Forecast Demand

The analysis was updated in May 2008 to reflect the emme/3 modelling developed for 2031 using forecast population and employment data provided by the City of Ottawa and City of Gatineau. This analysis reflects the a.m. peak hour in contrast to previous p.m. peak hour forecasts. The future forecast demand across the screenline is illustrated in **Table 3, Forecast Person Trips a.m. Peak Hour, Peak Direction** by means of a range of transit mode splits.

The level-of-service objective for the entire interprovincial screenline is a vehicle capacity of 0.85 (85 percent). This figure is consistent with the screenline objectives previously used for the 1994 and 1999 Interprovincial studies. Three sensitivity tests are presented in **Table 3**. This table shows a large range of variables of which the most important is the transit mode share and how effective the approach roadways are to providing free flow links to new crossings. Achieving the most aggressive transit targets will require three lanes of new roadway capacity in the peak direction. Lower mode shares on transit will require up to seven lanes in the peak direction.

Table 3
2031 Forecast Person Trips for a.m. Peak Hour, Peak Direction Interprovincial Screenline

Scenario	Auto Person-Trips	Transit Person-Trips	Total Person-Trips	Vehicle Demand/h (Note 1)	Vehicle Capacity (v/c) Objective	Required Supply	Deficiency	Lane Deficiency (Note 2) (Note 3)	
1. 30% Mode Split	19,741	8,412	28,153	15,840	v/c= 0.85	18,635	6,335	5	7
2. 36% Mode Split	18,018	10,135	28,153	14,414	v/c=0.85	16,957	4,657	4	5
3. 43% Mode Split	16,048	12,105	28,153	12,838	v/c=0.85	15,104	2,804	3	3

Notes:

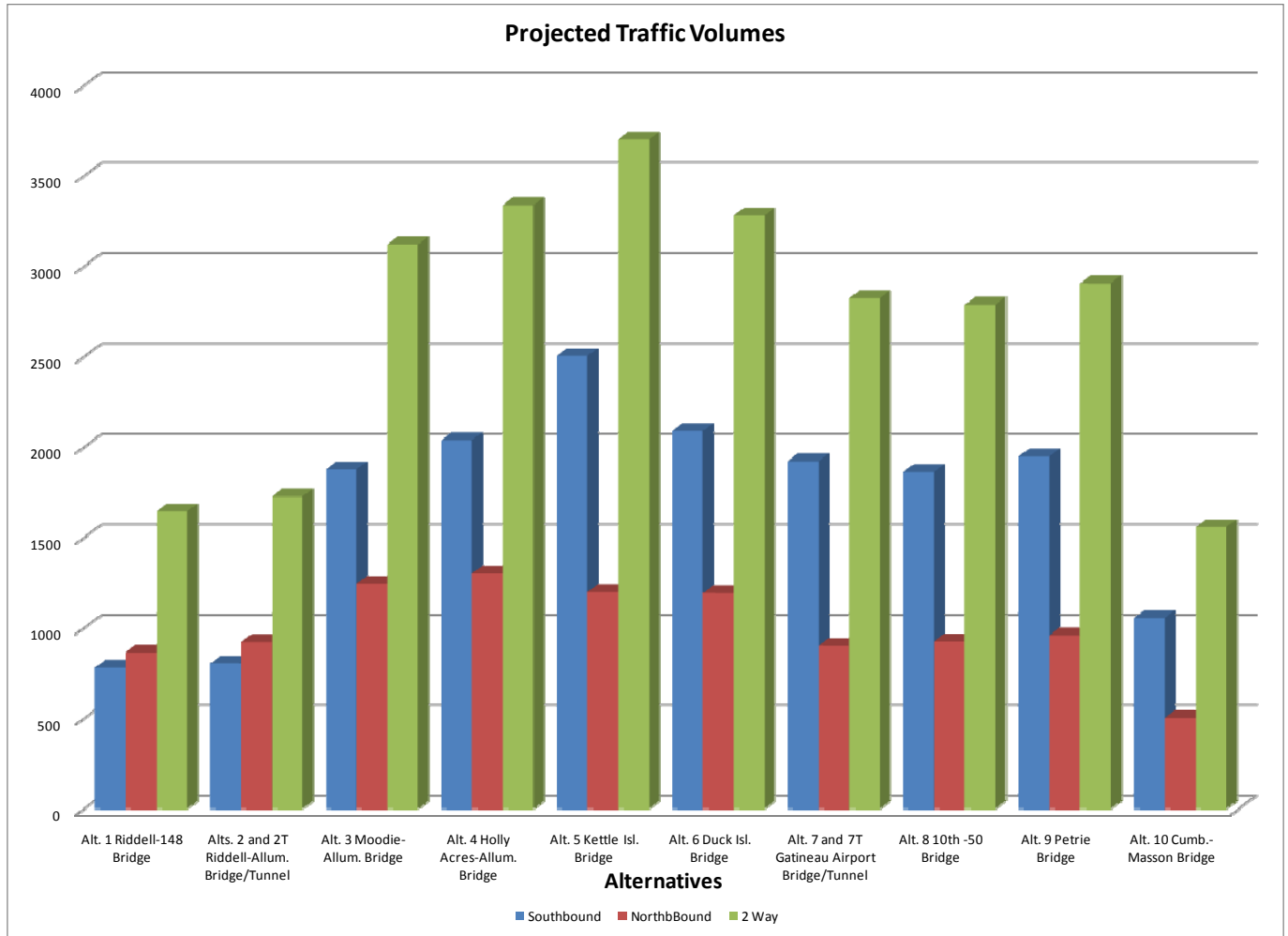
- 1) Vehicle occupancy = 1.25
- 2) Lane capacity = 1200 vehicles/h
- 3) Lane capacity = 900 vehicles/h
- 4) Existing Capacity = 12,300 vehicles/h

A graphical summary of the resulting 2031 morning peak hour traffic demands at each crossing location are illustrated in **Figure 6, Traffic Demand a.m. Peak Hour**.

Based on this review, the total person-trips for the year 2031 is generally equal to or slightly lower than previous forecasts (i.e. for 2021) across the interprovincial screenline. This shows positive results for the transit-supporting measures implemented since 2000. Nevertheless, using the above values, the total lane deficiency will be three lanes in the peak direction if the most aggressive transit target of 43 percent is met; four to five lanes for a 36 percent transit mode share, depending on the efficiency of the downstream intersections; and five to seven lanes if the transit mode share is 30 percent.

The recommended crossing as currently proposed by this EA, will provide a four-lane facility with two travel lanes per direction. It is below the required number of lanes under all scenarios presented in **Table 3**. It is therefore imperative that these aggressive transit targets be met and that parallel transit initiatives be planned and implemented across this screenline. As well, potential corridors (east and west) will require protection to accommodate for growth up to and beyond 2031.

Figure 6
 2031 Traffic Demand a.m. Peak Hour⁷



⁷ emme/3 results, spring 2008, TRANS Committee

4.2 TRANSIT

Municipal transportation planning in the NCR has established ambitious transit usage objectives for interprovincial travel. By 2031, it is projected that transit will accommodate 36 percent (2003 Ottawa TMP) and 43 percent (draft 2008 Ottawa TMP) of all person trips across the Ottawa River screenline in the morning peak hour, a rate nearly double the 2001 level of 16 percent. This ambitious objective requires a comprehensive package of supporting measures to make transit more competitive relative to car use and to help make it the first choice for commuters.

The Société de transport de l'Outaouais (STO) Transportation Plan⁸ integrates public transit and the road network. This plan proposed introducing a new urban development pattern, promoting public transit use, and introducing transportation demand management measures. This plan proposed a number of further recommendations:

- Maintaining public ownership of lands along potential future transportation corridors:
 - Deschênes Boulevard (MTQ), for a future bridge across the Ottawa River (Britannia);
 - Montée Paiement (City of Gatineau), for a future bridge across the Ottawa River (Kettle Island);
- Acquiring private lands along potential future transportation corridors:
 - Rail corridors;
 - De la Carrière Boulevard and its corridor (between Montclair and Ottawa River), for a future bridge across the Ottawa River (Lemieux Island);
 - Montée Paiement corridor (South of Maloney), for a future bridge across the Ottawa River (Kettle Island);
- Adding a third reversible lane on Champlain Bridge;
- Initiating a study for an interprovincial reserved-lanes network (possibly on Champlain and Portage bridges);
- Initiating a study for interprovincial integration of public transit services;
- Adding/developing a new interprovincial private right-of-way rapid transit system and HOV reserved lanes;
- Implementing transportation demand management measures for interprovincial travel movements:
 - Carpooling (computerized coordination centre);
 - HOV reserved lanes (Portage Bridge approach);
 - Interprovincial private right-of-way for rapid transit system and HOV reserved lanes;
- Developing transportation demand management measures for interprovincial movements;

⁸ *Plan intégré des réseaux routier et de transport en commun*, November 1994, prepared by Deluc for STO

- Interprovincial private right-of-way for rapid transit system and HOV reserved lanes (subsequent phases); and
- Achieving transit modal share objectives of 30 percent in 2011 and 40 percent in 2046.

The public consultation sessions carried out as part of the plan led to a number of recommendations; one of these was the construction of new bridges across the Ottawa River, including:

- Britannia-Deschênes;
- Masson-Angers-Cumberland; and
- Addition of a third reversible lane on Champlain Bridge.

STO currently operates approximately 120 buses serving 4,400 peak hour transit passengers through Ottawa's central core on the Rideau/Wellington Street corridor. The combined operation of STO interprovincial and OC Transpo transit on the Rideau/Wellington corridor is currently nearing capacity. This interprovincial ridership demand is expected to increase to 10,000 peak hour passengers by 2031, which translates to a 36 percent mode share and approximately 250 standard buses in the peak hour. STO currently uses standard buses to service its interprovincial passengers. STO has plans for a future Bus Rapid Transit (BRT) operation in a freight rail corridor in Gatineau (RAPIBUS Project) and does not anticipate any need to convert to rail transit service within the planning horizon.

The City of Ottawa approved the rapid transit network to the year 2031 (as part of the Transportation Master Plan Update, approved by Council November 28, 2008). A detailed examination of downtown transit will be completed as part of the Interprovincial Transit Integration Strategic Planning Study. The study will be managed by the National Capital Commission in partnership with the City of Ottawa and STO/Gatineau.

Transit corridors are generally more radially oriented to or from the downtown central business district to offer greater benefits to areas of high population and employment levels and to provide integration opportunities with current transit services. It is expected that the Interprovincial Transit Integration Strategic Planning Study will include any new or existing corridors in the core area in the examination of transit options for the NCR.

As part of the transit initiative, the City of Ottawa has also made a commitment to TDM and complementary land-use policies, including:

- Applying TDM measures to change behaviour and promote transit as a more sustainable mode of travel;
- Identifying density targets for areas adjacent to rapid transit stations, especially at mixed-use centers;
- Ensuring that the type of development at rapid transit stations supports transit;

- Increasing the overall accessibility of the rapid transit station; and
- Revisiting zoning by-laws to ensure that intensification targets can be met and “up-zone” (increase densities) if necessary to facilitate intensification.

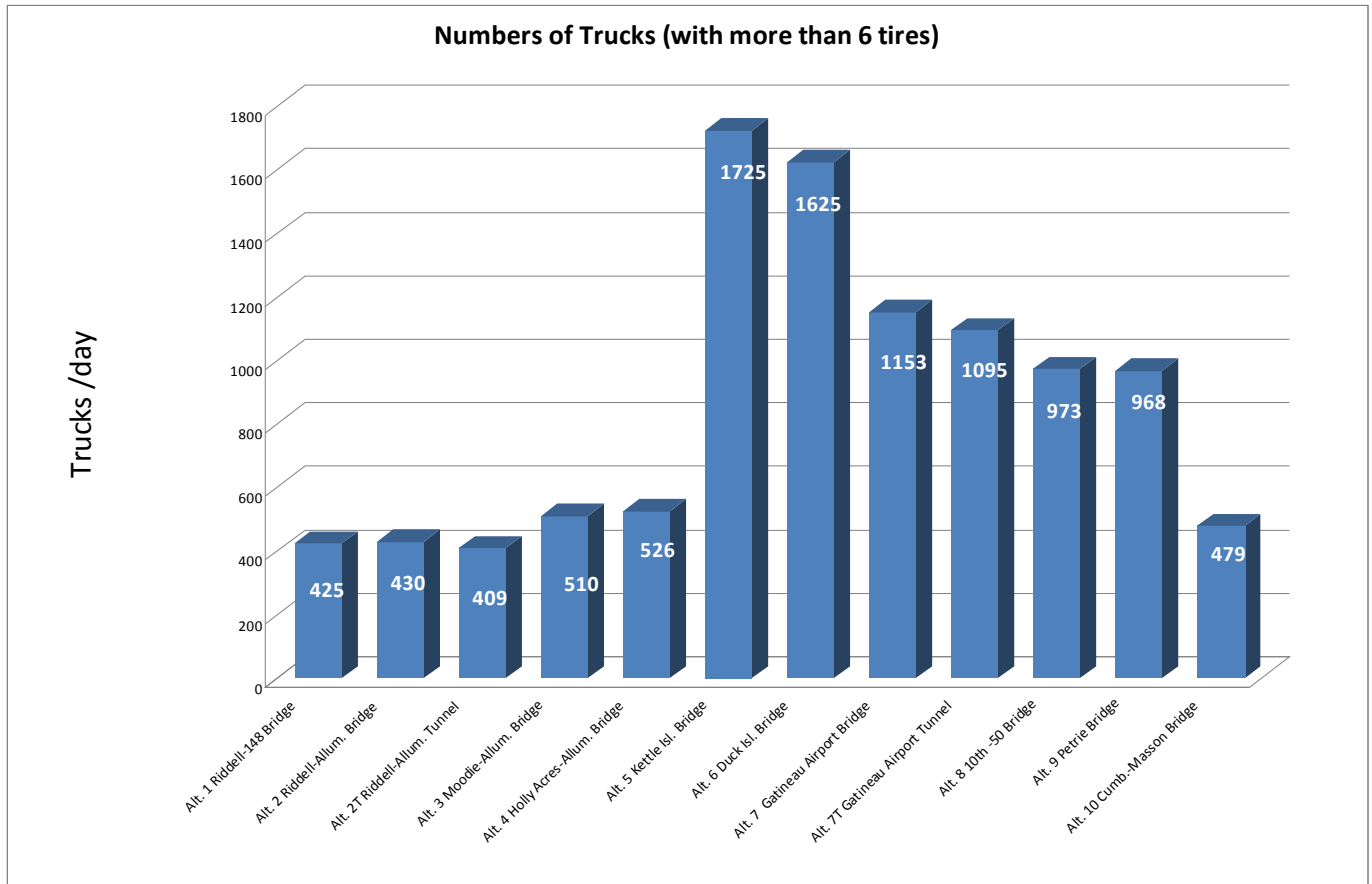
Substantial increases in transit, cycling, walking and enhanced TDM measures have been included in the analysis of future travel demand across the Ottawa River screenline. Despite these substantial increases, and reduced growth in car demand, there will be a need for additional roadway capacity across the Ottawa River.

4.3 TRUCK ANALYSIS

The current truck route through Ottawa’s central business district involves travel on several urban roadways (e.g., King Edward, Rideau, Waller) and a number of difficult manoeuvres by truckers. These roads are not conducive to large vehicle movements because of narrow lanes, tight corners, and a considerable number of pedestrians and cyclists throughout the corridor. Other issues include poor acceleration and deceleration for trucks and extended storage needs. Additionally, these streets are used for commercial/retail businesses (King Edward and Rideau Streets), residences (King Edward, Rideau, and Waller Streets) and institutions (University of Ottawa area), which are affected by the noise and vibration of heavy vehicle movements. Adding one or more new crossing(s) will reduce the volume of commercial vehicles in the downtown by removing those with no origin or destination in the central business district.

A graphical summary of the truck traffic demand at each candidate crossing is illustrated in **Figure 7** Number of Trucks/Day Forecast at Each Crossing (2031) (Two-way Travel).

Figure 7
Number of Trucks/Day Forecast at Each Crossing (2031)
(Two-way Travel)⁹



4.4 TECHNOLOGY SCREENING

The next screening assessment reviewed technology alternatives. At this stage, bridge, tunnel and ferry technologies were considered. All bridge alternatives were carried forward for detailed evaluation.

⁹ emme/ 3 Model runs, Spring 2008, TRANS Committee

4.4.1 Ferry Alternatives

The assessment of a ferry option to service the traffic demand of car and truck traffic concluded that it would not provide the capacity to meet forecast demand across the screenline. In addition, this option does not meet the second study objective of accommodating substantial truck traffic. Based on this conclusion, it was recommended that the use of ferries not be carried forward as an option. Therefore, only bridge and tunnel options were carried forward for detailed evaluation.

4.4.2 Tunnel Alternatives

The assessment of tunnel options to service the traffic demand of car and truck traffic concluded that it was technically feasible to implement tunnels on two corridors (refer to **Table 4**, Summary of Tunnel Feasibility Analyses). The feasibility of constructing a tunnel at each location was based on the water depth, length, and alignment of the crossing; type of subsurface conditions; roadway grade requirements; and the location of the approaches with the roadway networks in Quebec and Ontario. Based on the results of this investigation, it was recommended that the tunnel alternative at Crossing 2 - 148/Boulevard des Allumettières Riddell/March/417 and the tunnel alternative at Crossing 7 - Gatineau Airport/Baie McLaurin (50-174/417) be carried forward. Therefore, ten bridge and two tunnel options were recommended to be carried forward for the detailed technical evaluation.

**Table 4
Summary of Tunnel Feasibility Analyses**

TUNNEL							
Crossing No.	Ontario			Quebec		Viability	Comments
	Network Connection	Tunnel Grades	Mid-tunnel Depth	Tunnel Grades	Network Connection		
1						No	Not a viable option on the Quebec approach.
2						Yes	Viable. Exit grade is greater than maximum permissible; reducing grade to 5% provides an acceptable connection to Blvd. des Allumettières despite lack of connection to Rue Front.
3						No	Not a viable option on either the Ontario or Quebec approach.
4						No	Not a viable option on either the Ontario or Quebec approach.
5						No	Not a viable option on the Quebec approach.
6						No	Not a viable option on either the Ontario or Quebec approach.
7						Yes	Viable. All parameters are met.
8						No	Not a viable option on the Ontario approach.
9						No	Not a viable option as proposed, despite revisions to the Ontario exit grade; also, Quebec portal does not permit a connection to Montreal Road.
10						No	Not a viable option on the Ontario approach.

5.0 EXISTING ENVIRONMENTAL CONDITIONS

Phase 1 of the EA defined existing environmental conditions to avoid, minimize, or prevent potential adverse environmental effects to the greatest extent possible.

The Study Team completed an inventory of existing environmental conditions to establish a baseline for comparing the proposed alternatives. For the purposes of this project, a reasonable broadband corridor width was inventoried for each option to allow more precise definition of alignments that generally avoided significant environmental constraints. The inventories assessed the natural, cultural, and social environments to identify significant constraints within each corridor.

The complete documentation of the environmental inventories is included in the Technical Appendix of the EA.

6.0 PUBLIC CONSULTATION

Public consultation was a key component of the EA. The general public, interest groups, and external agencies were notified and updated throughout the process through public notices and public consultation sessions (PCSs), which were held at key milestone dates.

A Technical Advisory Committee (TAC) was established to advise the Study Team throughout the study. TAC meetings were held to coincide with the key study stages. In addition, throughout the study, a number of supplementary meetings were held. A list of TAC agencies is provided in Section 1.3. The purpose of these meetings was to allow all affected parties the opportunity to participate in the project and provide comments on the study process.

Community groups in the vicinity of the corridors and interested parties established a Public Consultation Group to provide input on issues and local considerations. The list of associations who were invited to participate in the Public Consultation Group is provided in **Table 5, Public Consultation Group Participants**.

**Table 5
Public Consultation Group Participants**

Community Associations in Ontario	
	Convent Glen Community Association
	Riverwalk Community Association
	Chatelaine Village Community Association
	Queenswood Heights Community Association
	Ottawa - Carleton District School Board (OCDSB) Trustee
	Conseil des écoles catholiques de langue française du Centre-Est (CECLFCE) Trustee
	Le Conseil des écoles publiques de l'Est de l'Ontario (CEPEO) Trustee
	President of Multicultural Association
	Heart of Orleans BIA President
	Fallingbrook Community Association
	Orleans Woods Community Association
	Manor Park Community Association
	Friends of the O-Train
	Westboro Community Association
	Woodpark Community Association
	Britannia Village Community Association
	South March Community Association
	Environment for the Briarbrook/Morgan's Grant Community Association
	Action Sandy Hill
	City Centre Coalition
	Dalhousie Community Association
	Friends of Petrie Island and the Petrie Island Advisory Committee
	Cardinal Creek Community Association
	Crystal Beach/Lakeview Community Association
	Crystal Beach/Lakeview Community Association, Transportation Committee
	March Rural Community Association
	King Edward Avenue Task Force
	Lowertown Community Association
	Island Park Community Association
	Kanata Lakes Community Association
	Pontiac Bridge Committee
	Rockcliffe Community Association
Community Associations in Quebec	
	Association des résidents de la Croisée
	Association des résidents de la Terrasse Lakeview
	Association des résidents du quartier village Parc Lucerne
	Association des résidents de l'Île-de-Hull

	Association des résidents du District 15
	Comité de vie quartier Pointe-Gatineau
	Association des citoyens du Manoir des Trembles
	Collectif Vigilance Petite-Nation
	Association des résidents du Parc Champlain et des environs
Business Groups	
	Team Ottawa-Orléans/Équipe Ottawa-Orléans
	Chambre de commerce de Gatineau
	Ottawa Chamber of Commerce
	Le Regroupement des gens d'affaires de la Capitale nationale
Environmental	
	Ottawa Riverkeeper Inc.
	Ottawa Field Naturalists
	Canadian Parks and Wilderness Society - Ottawa Chapter
	Greenspace Alliance
	Go for Green
Interest Groups	
	Kriska Transportation / Ontario Trucking Association (OTA)
	Nepean Sailing Club
	Federation of Citizens Association
	Club Vélo Plaisirs
	Club de voile Grande rivière
	Britannia Yacht Club
	Lac Deschênes Sailing Club
	Marina de Hull
	Jp2g Consultants Inc.
	Rockcliffe Yacht Club
	Ottawa New Edinburgh Club
	Ontario Kiteboarding Association
Observers	
	Councillor, Bay Ward
	Queensway Terrace North Community Association
	Whitehaven Community Association
	Woodpark Community Association
	Ward 1 - Orléans
	Ward 15 - Kitchissippi
	Ottawa Central Railway
	North of Richmond Condo Group

Information on the study was distributed to the general public through a variety of community information tools, including:

- public consultation sessions at key milestones;
- a website;
- newspaper notices;
- media briefings; and
- supplementary meetings with the Public Consultation Group, boating groups, and external agencies.

Four PCSs took place in two to six venues each at various locations in Ottawa and Gatineau. PCSs were performed as open-houses and presentations to allow the public to review, examine, and exchange information; to ask questions; and to provide comments. Advertisements were placed in local newspapers and on the project website to announce the dates, times, and locations of the public consultation sessions.

6.1 PCS 1 (SPRING 2007)

The purpose of this first PCS was to present the following:

- Draft study Terms of Reference;
- Study process;
- Alternative planning solutions; and
- Crossing alternatives.

PCS 1 included three individual meetings held on each side of the Ottawa River in the east, central, and west sectors. Of these six meetings, two on each side of the river were performed as open houses (drop-in style). The other two meetings were followed by a formal presentation and a question period. The meetings were held at the following locations:

- École secondaire du Versant, Wednesday June 6, 2007 (open house);
- Centre de services d'Aylmer, Thursday June 7, 2007 (open house);
- Maison du citoyen, Tuesday June 12, 2007 (open house and presentation);
- Kanata Recreation Complex, Wednesday June 13, 2007 (open house);
- Sir Wilfred Laurier Secondary School, Thursday June 14, 2007 (open house); and
- Ottawa City Hall, Monday June 18, 2007 (open house and presentation).

Notices of PCS 1 were placed in the following local newspapers prior to the event:

- The Ottawa Citizen – May 23, 2007;
- Le Droit – May 23, 2007; and
- La Revue de Gatineau, May 23, 2007.

In total, 391 people attended the six events. There were 416 submissions, consisting of 1,200 specific comments received via letters (fax, mail, or email), web comments (website form), comment sheets provided at the PCS, and telephone.

The following items were raised by the public in PCS 1:

- Concerns about selection and weighting of criteria;
- Concerns about input data and uncertainty of transportation models to be used;
- Suggestions to speed up the process;
- Insistence on previous study conclusions;
- Concerns about the consultation process;
- Comments to consider crossings at Chemin Pink – Riddell Drive; Deschênes – Pinecrest Road and East of Lower Duck – Boulevard de l’Aéroport; and
- Comments to return the Deschênes Rapids (Aylmer to Western Parkway) crossing to the list of alternatives.

As a result of this public input, two new crossings were added to the list of alternatives: Chemin Pink – Riddell Drive and the Gatineau Airport crossing (East of Lower Duck – Boulevard de l’Aéroport).

6.2 PCS 2 (WINTER 2008)

The objective of this public consultation was to seek comments on the following:

- Environmental inventories and constraints;
- Current traffic analyses;
- Alternative solutions;
- Preliminary alignments; and
- Preliminary evaluation criteria.

PCS 2 included three individual meetings held on each side of the Ottawa River in the east, central, and west sectors. Of these six meetings, two on each side of the river, were performed as open houses (drop-in style). The other two central meetings were followed by a formal presentation and a question period. These meetings were held at the following locations:

- École secondaire du Versant, Tuesday, February 12, 2008 (open house);

- Centre de services d'Aylmer, Wednesday, February 13, 2008 (open house);
- Maison du Citoyen Agora, Tuesday, February 19, 2008 (open house and presentation);
- Kanata Recreation Complex, Wednesday, February 20, 2008 (open house);
- Sir Wilfred Laurier Secondary School, Thursday, February 21, 2008 (open house); and
- Ottawa City Hall, Monday, February 25, 2008 (open house and presentation).

Notices of PCS 2 were placed in the following local newspapers prior to the event:

- The Ottawa Citizen – January 30, 2008; and
- Le Droit – January 30, 2008.

In total, 720 people attended the six events and 713 submissions were received via letters (fax, mail, or email), web comments (website form), comment sheets provided at the PCS, and by telephone.

The following items were raised by the public at PCS 2:

- Concerns about selection and weighting of criteria;
- Concerns about input data (accuracy/context);
- Concerns about the accuracy of traffic forecasts;
- Suggestions to speed up the process;
- Concerns about public transit as an element to be part of or be taken into account by the study;
- Significance of various existing land use constraints (i.e., Rockcliffe Airport, Andrew Hayden Park, Connaught Rifle Range, Petrie Island, etc.); and
- Concerns about the consultation process.

As a result of this public input, an additional session was held to provide more detail as to how criteria (specifically, sub-factor criteria described in Section 9.1) and data were developed and considered, allowing the public more opportunity to comment. (This resulted in an additional series of PCSs, to be held prior to the evaluation of the crossing locations).

6.3 PCS 3 (SPRING 2008)

The purpose of PCS 3 was to provide information and obtain input and comments on the following items:

- Analyses of projected traffic;
- Truck origins and destinations;
- Short list of evaluation criteria;
- Evaluation process; and
- Evaluation methodology.

PCS 3 consisted of two individual meetings held in June in an open-house format (drop-in style) with a presentation. These meetings were held at Maison du citoyen on Wednesday, June 11, 2008 and at Ottawa City Hall on Tuesday, June 17, 2008.

Notices of PCS 3 were placed in the following local newspapers prior to the event:

- The Ottawa Citizen – June 3, 2008; and
- Le Droit – June 3, 2008.

In total, 316 people attended the two events and 2,149 comments were received via letters (fax, mail, or email), web comments (website form), comment sheets provided at the PCS, and telephone.

The following items were raised by the public at the meetings:

- Traffic;
- Sailing;
- Natural environment;
- Pollution;
- Cost;
- Property values;
- Quality of life;
- RCMP facilities;
- Monfort Hospital; and
- Transit.

As a consequence of this public input, data and measurements were modified to accommodate sub-factors or modify sub-factors related to sailing activities, reduce impacts on water purification plants, and support community cohesion.

Members of the public were given an opportunity, on comment sheets, to express their views on the importance of the factor groups by ranking them from 1 to 7, with 1 being the most important ranking and 7 least important. Refer to **Table 6**, Summary of Comments – Ranking of Topics of Interest.

Table 6
Summary of Comments - Ranking of Topics of Interest

Factor	Ranking (Most to Least important)
Natural Environment	1st (Most Important)
Water Use and Resources	2nd
Cultural	3rd
Land Use and Property	4th
Socio Economic	5th
Traffic and Transportation	6th
Cost	7th (Least Important)

As indicated on **Table 6** respondents ranked the natural environment as the most important factor and cost as the least. The second-highest ranked factor was water use and resources, with cultural environment a close third.

The public’s feedback on the evaluation criteria was provided to the Evaluation Committee prior to the evaluation session.

6.4 PCS 4 (FALL 2008)

The objective of this public consultation was to present the results of the detailed technical evaluation, the ranking of alternatives, and the Technically Preferred Alternative for a future crossing of the Ottawa River. The following information was available for input and comment:

- Evaluation of crossing alternatives;
- Plan of the Technically Preferred Alternative; and
- Recommended Project for Phase 2 of the EA.

For PCS 4, two individual meetings were held in September 2008 in an open-house style format (drop-in style) with a presentation. These meetings were held at Maison du citoyen on Tuesday, September 23, 2008 and at Lansdowne Park on Wednesday, September 24, 2008.

There were 931 people at the two events and 1,688 submissions were made with 8,801 specific comments received via letters (fax, mail, or email), web comments (website form), comment sheets provided at the PCS, and telephone.

The following items were raised by the public:

- Concerns about the lack of transparency and perception of bias;
- Concerns with measured data, suggestions for reviewing the study by an independent organization;
- Recommendation for sustainable or longer term regional planning, including proposals for a ring road;
- Need for democratic input or a referendum, due to perceived lack of transparency and community input;
- Concerns that study goals are not being met with respect to truck reduction in the central business district;
- Not enough weight given to quality of life (human and environment-related) factors, usually as compared to transportation or cost;
- Questioning of evaluation and objectiveness;
- Disapproval of evaluation's outcome;
- Proposal of another alternative(s) – such as a regional ring road and/or how Corridor 5 or another corridor can constitute a component of a ring road, a tunnel under King Edward Avenue or the use of the Prince of Wales Bridge for rail;
- Requests to carrying forward another corridor instead of Corridor 5 – generally corridors 6 or 7.
- Recommendations to carry forward more than one corridor;
- Traffic concerns;
- Analysis and evaluation concerns;
- Air quality concerns;
- Proposals to improve public transit by rail or buses;
- Land-use controls;
- TSM or TDM;
- Concerns regarding the impacts on communities such as: air quality, noise and vibrations, safety (mostly regarding hazardous materials), health (generally air quality), through traffic (truck related), and recreational facilities; and
- Concerns for effects to local institutional land uses such as: the Montfort Hospital, Aviation Museum, Rockcliffe Airport, Cité Collégiale, and RCMP Stables and the Musical Ride.

As a result of the public's input, Phase 2 of the EA will include a detailed study of the recommended crossing location (Corridor 5). This study will explain how effects on the environment will be reduced and

investigate opportunities for environmental enhancement to receive the appropriate approvals and meet legislative requirements.

6.5 MEDIA BRIEFINGS

Media briefings were provided to Members of Parliament, Members of the Provincial Parliament, City Councillors, and the local press prior to each PCS. A complete package of the PCS information was distributed at the media briefings.

7.0 FIRST NATIONS CONSULTATION

The Federal and Provincial governments consulted with Aboriginal communities to address their interests and comply with the requirements of both EA legislation and Treasury Board of Canada's legal framework for consultation and accommodation with Aboriginal groups. These Ontario and Quebec First Nation communities and agencies were asked to identify any potential interest and to confirm their participation in the consultation process. An Aboriginal Consultation Plan was cooperatively developed during the EA study with any potentially affected Aboriginal groups that wish to participate in the EA study process.

At each key study milestone, the study informed the Algonquin First Nations about its progress. On the Ontario side, the information was provided to the Negotiating Representative for the Algonquins of Pikwàkanagàn, and on the Quebec side to the Kitigan Zibi Anishinabeg Band Council, including offers to meet to discuss the project as well as potential aboriginal interests (three meetings occurred during Phase 1).

The Kitigan Zibi Anishinabeg First Nation at Maniwaki has identified a concern with rights and title to the islands in the Ottawa River. As greater certainty develops in defining the design, more specific dialogue will be forthcoming. The Study Team will continue to consult with these First Nations groups throughout Phase 2.

8.0 EVALUATION OF CROSSING ALTERNATIVES

Following the initial evaluation of planning solutions described in Section 3.0, the study assessed design alternatives, or “alternative methods” of implementing the undertaking (as required under the Ontario *Environmental Assessment Act*). The evaluation of these alternative methods included the following steps:

1. Definition of more specific alignments within each broad-band corridor based on constraint mapping prepared from the environmental inventories (qualitative assessment);
2. Second stage coarse screening that eliminated corridors or crossing types that were unfeasible due to engineering constraints (eight tunnel alternatives);
3. A qualitative assessment of applicable crossing types for each respective corridor, comparing ferry, bridge, and tunnel crossings (from this review, the bridge and tunnel technologies were carried forward); and
4. A detailed quantitative evaluation of design alternatives carried forward following the initial screenings (assessing 10 bridge and two tunnel alternatives in the 10 crossing locations).

9.0 DETAILED EVALUATION OF ALTERNATIVES

For the evaluation of alternative corridors (alignments and technologies in each corridor) the study used the Multiple Attribute Trade-off System (MATS), a computer-based, weighted additive method. This method has been used worldwide and in North America for traceable decision-making for public infrastructure projects. This approach provides numerical scores for each alternative and allows the public a greater understanding of the trade-offs used to rank alternatives. MATS focuses on the differences between alternatives, addresses the complexity of the base data and is best suited for situations with numerous alternatives and criteria, or where there are trade-offs between competing criteria. It is generally used when dealing with controversial issues and also allows for sensitivity tests.

This systematic approach is consistent with MTO/MTQ and MOE practices for the evaluation of alternatives. It avoids many of the pitfalls associated with less formal techniques by using an analytical approach that measures scores based on a mathematical relationship, i.e., the degree of subjectivity by the Evaluation Committee is minimized. It is traceable, allowing the Evaluation Committee and public to assess trade-offs involved in the evaluation and examine this information in the decision-making process.

9.1 EVALUATION CRITERIA

The evaluation criteria were grouped into seven broad categories (factor groups) to describe the study-specific engineering and environmental concerns and to be used for each evaluation. Each of these factor groups contains sub-criteria, described as “sub-factors” and listed as follows under each category. The sub-factors help define the performance or level of effect for each attribute being measured. The factors and sub-factors carried forward include:

Traffic and Transportation:

- Truck Traffic
- Ability to accommodate hazardous goods
- Vehicle Demand
- Vehicular Traffic Reductions From Existing Crossings
- Spacing of Signalized Intersections
- Quality of Arterial Road Connection
- Non- motorized modes of travel
- Quality of connection to provincial highway system
- Variation of average travel time per transit trip - without transit use of link
- Variation of transit ridership - without transit use of link
- Variation of average travel time per transit trip - with transit use of link

- Variation of transit ridership - with transit use of link

Natural Environment:

- Significant Species
 - Fish SAR
 - Fish SAR - Potential
 - SAR (SARA, SARO, Quebec designated)
 - Potential SAR (Special Concern and Provincially Rare)
 - Regional Rare in Ottawa and Gatineau
- Air Quality/Green House Gases
 - Total Emission Burden for Criteria Contaminants
 - Total Emission Burden for GHG Contaminants
 - Impact on Residents
- Fisheries and Fish Habitat
 - Extent of aquatic vegetation within the corridor or Project footprint
 - Number of confirmed and potential spawning sites within corridor
 - Number of confirmed and potential spawning sites within 2 km of corridor
 - Project footprint
 - Off-channel fish habitat – extent of the floodplain
 - Off-channel fish habitat – Number (length) of tributaries crossings
 - Fish habitat structure – Shoreline length (edges)
 - Fish habitat condition – Shoreline disturbance
- Hydrotechnical
 - River Hydraulics
 - Water Quality
 - Floodplain Storage Impacted
- Terrestrial
 - Provincially Significant natural areas and habitat (excluding wetlands)
 - Regionally Significant natural areas and habitat (excluding wetlands)
 - Provincially Significant Wetlands
 - Waterfowl Staging Areas
 - Significant Valley Lands
 - Natural Woodlands
 - Interior forest

- Inland Wildlife Corridor

Cultural Environment:

- Heritage and Archaeological
 - Built Heritage sites impacted
 - Historic Archaeological potential areas impacted
 - Cultural landscape features (ON)
 - Aboriginal Archaeological potential - High (Federal Lands only)
 - Aboriginal Archaeological potential - Medium (Federal Lands only)
 - Aboriginal Archaeological potential - Low (Federal Lands only)
 - Prehistoric Potential Areas Impacted
- Community
 - Number of Receiver Sites with 3 dBa increases
 - Vibration impacts
 - Community Cohesion
 - Water Wells Impacted
 - Visual Intrusion Bridge
 - Visual Intrusion Road
 - Impact to the Cumberland Masson Ferry
 - Magnetic Field Impact on Monfort Hospital MRI
- Recreation
 - Cycling Facilities (road)
 - Andrew Haydon Park
 - Riverfront Park
 - Petrie Island Stumer Park
 - Scenic Parkways
 - Mixed Use Pathways (off-road)

Water Use and Resources

- Impacts on water purification plants
- Views or vistas Impacted
- Relocation of Sailing Club
- Impact on Sailing Activities

Socio-Economic Environment

- Potential for support and improvement of Metropolitan downtown economy (tourism, redevelopment, etc.)
- Potential for industrial and intermodal economic development in the new corridor
- Potential for Service and Office Economic Development in the new corridor
- Travel time savings–personal vehicles and transit
- Travel time savings–commercial vehicle
- Vehicles operating cost savings personal cars
- Vehicles operating cost savings commercial vehicles

Land Use and Property

- Conformity with Official Plan and Other Land Use Strategies
- Loss of future development
- Recreational property required
- Residential property required not including buyouts
- Commercial/industrial/ businesses property required (buyouts are not included)
- Institutional Property Required (excluding the Greenbelt and recreational areas and buyouts)
- Utility facility relocation
- Utility facility property required
- Institutional potential buy-out
- Residential potential buy-out
- Commercial potential buy-out
- Agricultural potential buy-out
- Agricultural property (protected Quebec) required
- Farm land severance
- Area of Greenbelt Severance (Crossings 6 and 7 to the Rockcliffe Parkway)
- Number of Potentially Contaminated Sites
- Agricultural property required (ON)

Costs

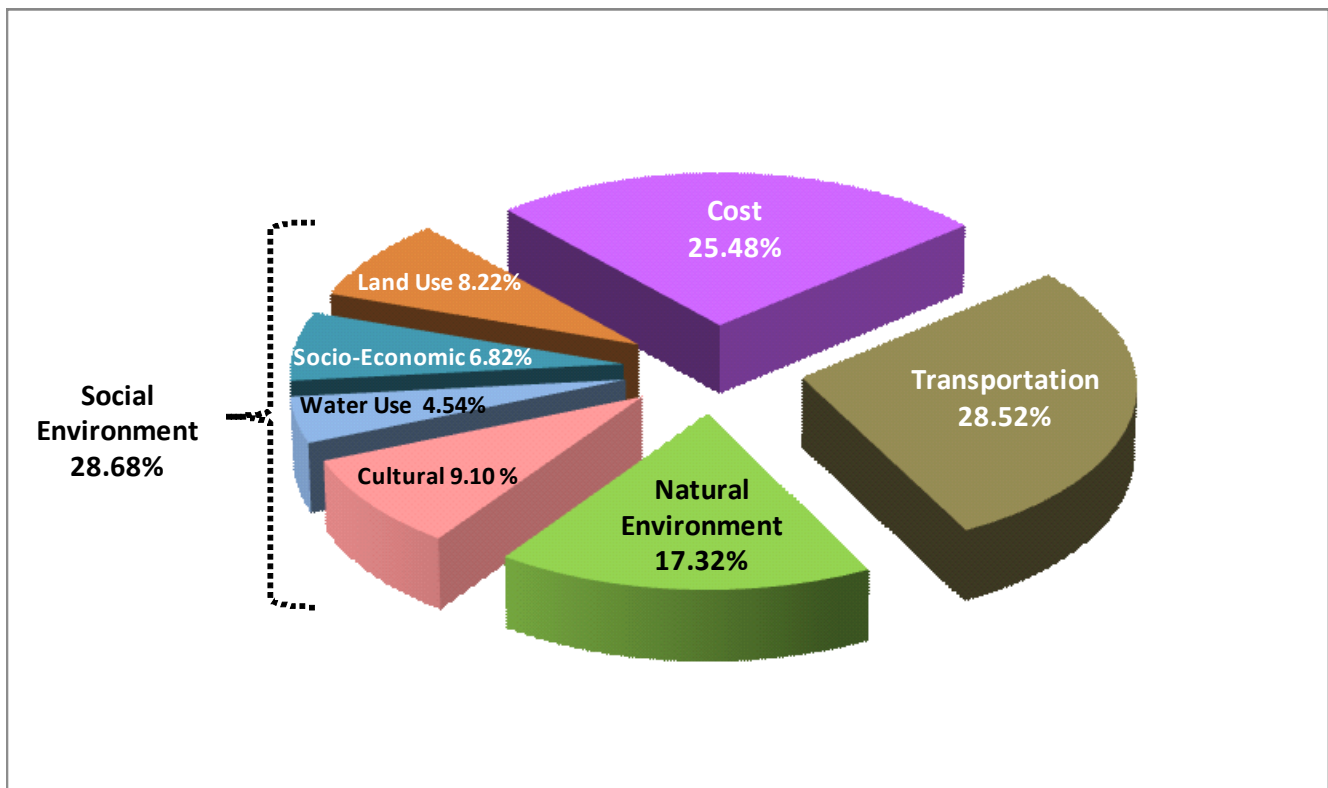
- Capital Costs
- Future maintenance and operating life cycle costs

9.2 WEIGHTING OF THE FACTORS AND SUB-FACTORS

The Evaluation Committee completed a weighting exercise to provide an independent and objective perspective of the relative importance of criteria. The Evaluation Committee consisted of a diverse group of representatives from all levels of government, including the NCC, other interested federal departments, MTQ, MTO, other interested provincial ministries, the cities of Ottawa and Gatineau, Transport 2000 and CREDDO as well as consultant environmental and transportation specialists. This group of technical specialists was selected as an objective, balanced group of environmental, transportation, and land-use planners to rate the competing performance and effects of the alternatives.

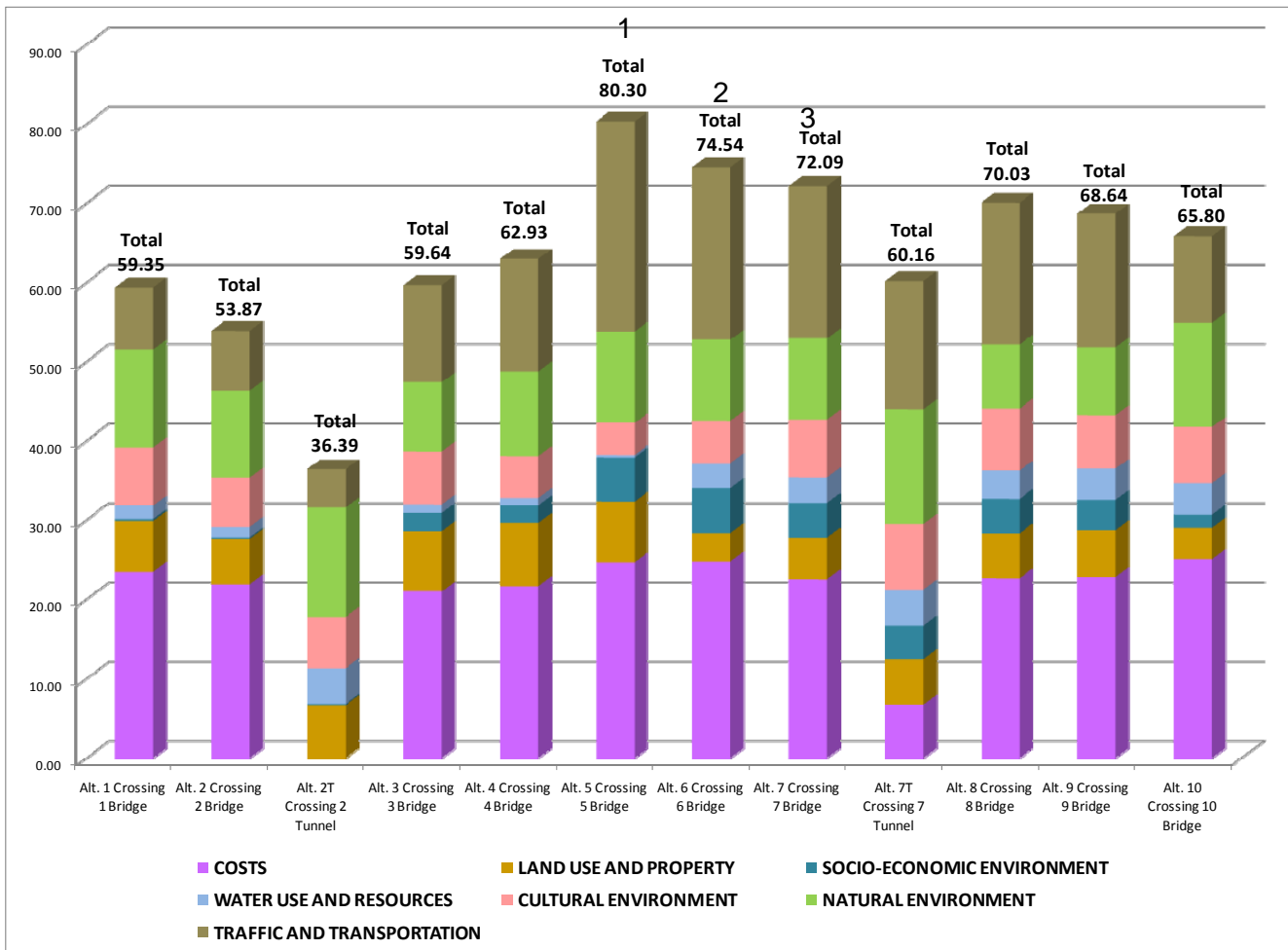
The average of the Evaluation Committee’s weight for each of the factor groups is illustrated in **Figure 8, Evaluation Committee Weights**. The factor group weights were essentially divided into four categories. Traffic and Transportation and Social Environmental factors (including Cultural Environment, Water Use and Resources, Socio-economic Environment, and Land Use and Property – all of which represent the human context for the project) received slightly more than 28 percent of the weight each. Cost received approximately a quarter of the weight (reflecting the large capital cost of the tunnel alternatives) and Natural Environment the remainder at 17.3 percent.

Figure 8
Evaluation Committee Weights



The results of the evaluation exercise are shown in **Figure 9**, Ranking of the Alternatives. A breakdown of the results in each of the seven factor groups and a brief description of how each corridor ranked within the category is provided in the following sections. Corridor 5 obtained the highest score, followed by Corridor 6 and Corridor 7.

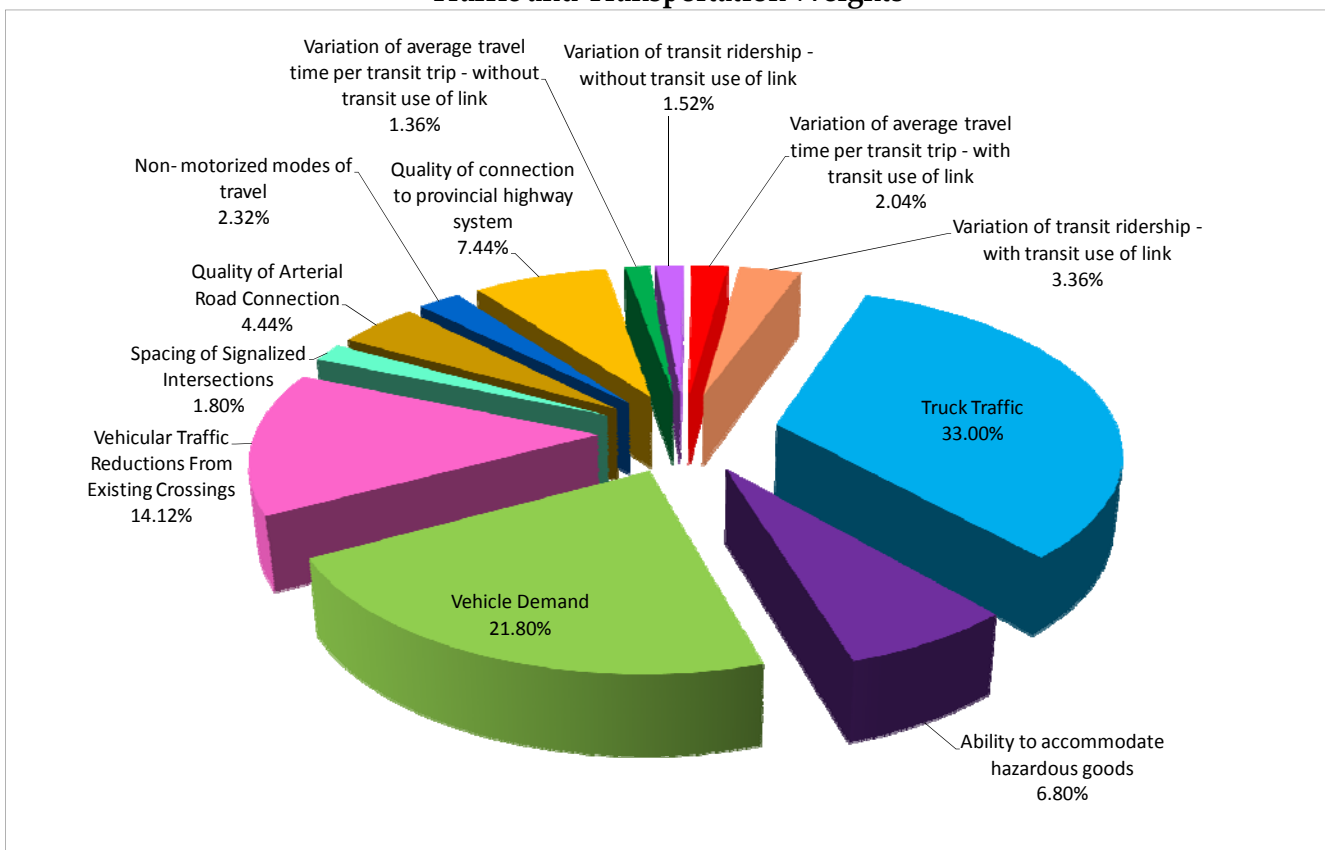
Figure 9
Ranking of Alternatives



9.2.1 Traffic and Transportation

The Evaluation Committee assigned Traffic and Transportation approximately 29 percent of the total weight of all seven factor groups – the most of any one factor group. The breakdown of Traffic and Transportation sub-factor weights are illustrated on **Figure 10, Traffic and Transportation Weights**.

**Figure 10
Traffic and Transportation Weights**



Of the Traffic and Transportation sub-factors, Truck Traffic was given the highest weight at one-third of the total for the sub-factor weights, with alternatives 5, 6 and 7 scoring the highest by attracting the most trucks. The second-highest ranked sub-factor was Vehicle Demand, with alternatives 5, 6, and 9 attracting the most vehicles. The sub-factor Vehicular Traffic Reductions from Existing Crossings came third, with alternatives 5, 4, and 3 diverting the most traffic from the existing crossings.

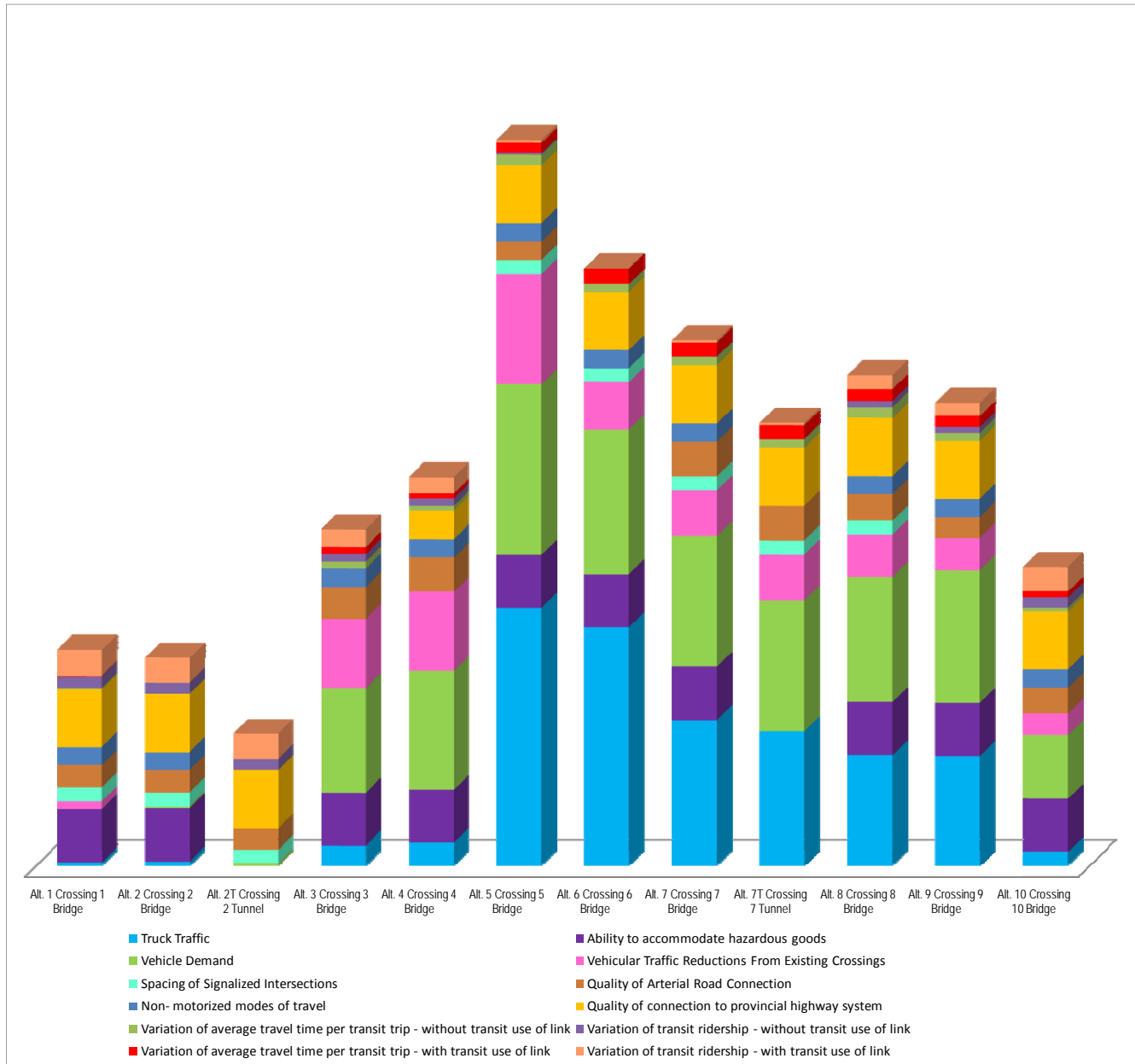
The alternative with the highest performance for these top three sub-factors was Corridor 5, Kettle Island, which therefore scored the highest under the Traffic and Transportation Factor group. The

alternative with the second-highest performance in two out of three of the most heavily weighted criteria was Corridor 6, Duck Island. Duck Island scored second for attracting trucks and vehicles; however, it was mid-range for removing vehicles from the existing bridges.

The remaining sub-factors were allocated slightly under one-third of the weight in the transportation factor group; the low values meant the aggregate score for these criteria was of lesser importance to the Evaluation Committee in the selection of a new crossing. Kettle Island scored well in all except in Quality of Arterial Road Connection (due to the high number of driveways along Montée Paiement) and Transit Ridership there would be more of a positive effect on ridership if the crossing were located away from the downtown core.

The score of each alternative in the Traffic and Transportation factor group is illustrated in **Figure 11**, Results of the Traffic and Transportation Weighted Scores.

Figure 11
Results of the Traffic and Transportation Weighted Scores



9.2.2 Natural Environment

The Evaluation Committee assigned Natural Environment approximately 17 percent of the total weight of the factor groups (making it the third-highest weighted factor group). The breakdown of the Natural Environment sub-factor weights is shown on **Figure 12**, Natural Environment Sub-factor Weights.

The highest weighted sub-factor in this factor group was the protection of Species at Risk (including SARA, SARO and Québec designations). Endangered or Threatened Species scheduled with the federal Species at Risk Act (SARA) are known to occur in the Ottawa Valley and are found in the crossing corridors. The occurrence of these species would require specific conservation/ protection actions. This factor group also included all occurring species of flora and vertebrate fauna designated as being provincial Species at Risk within Ontario or Québec. Alternatives 4 and 10 scored the highest with only five known SAR species. The remainder of the alternatives had a varying number of SAR species with Alternatives 3 and 7/7T having six, Alternatives 6 and 9 having seven and Alternatives 1, 5 and 9 having eight SAR species. Alternative 2 and 2T had the highest number of SAR species at eleven.

Included in the SAR category was the number of fish SAR species with only Alternative 4 having two known SAR species and the remaining alternatives had none, however background data at the crossing locations is not definitive and the potential for SAR species was determined to be the more important sub-factor with numbers ranging between 4 and 5 potential SAR fish species for all alternatives except the tunnel alternatives 2T and 7T.

The second-highest weighted sub-factor in this category was the impact of air quality on residents (Impact on Residents). Alternatives 2, 2T, 5, 7 and 7T had the least impact. The third-highest weighted sub-factor was Provincially Significant Wetlands. Alternatives 2, 2T, 5, 6 and 10 had the least impact. Other sub-factors included impact on fisheries and fish habitat, with the tunnel alternatives scoring the highest and alternative 3, 4, 8, and 9 receiving the lowest scores. Included in this factor group was the footprint area impact on the Ottawa River and number of water crossings with associated roadway works.

There were no alternatives with consistently high scores in the top three Natural Environment sub-factors, namely Species at Risk, Impact on Residents (air quality) and Provincially Significant Wetlands. Alternatives 2, 2T, 5 and 10 ranked highly in two of the top three natural environment sub-factors. Overall, alternative 7T had the highest score for most of the natural environment sub-factors, followed closely by alternative 2T. The poorest performing alternatives in this factor group were alternatives 8, 9, and 3.

The performance of all alternatives in the natural environment factor group is illustrated in **Figure 13**, Results of the Natural Environment Weighted Scores.

Figure 12
Natural Environment Sub-factor Weights

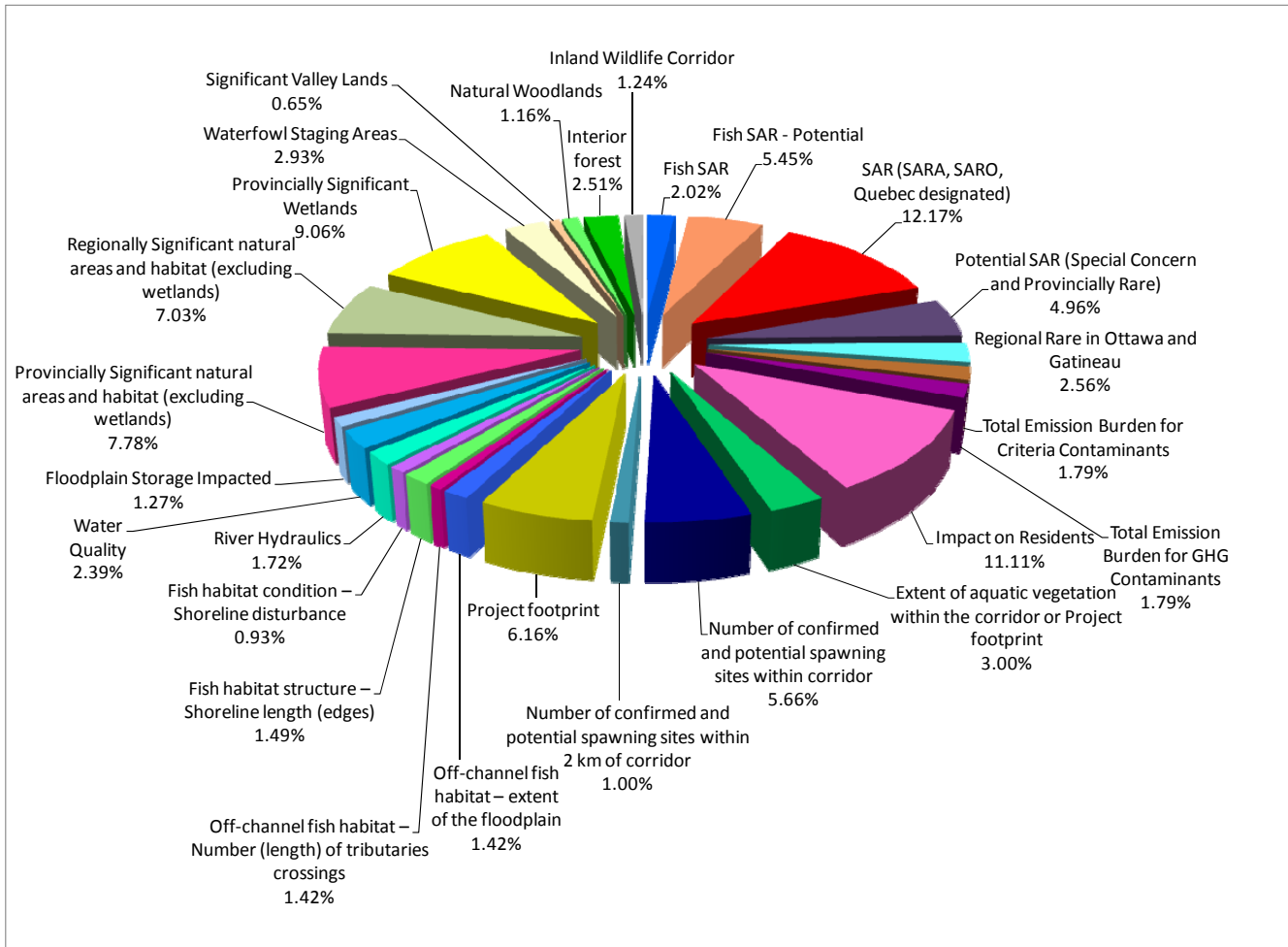
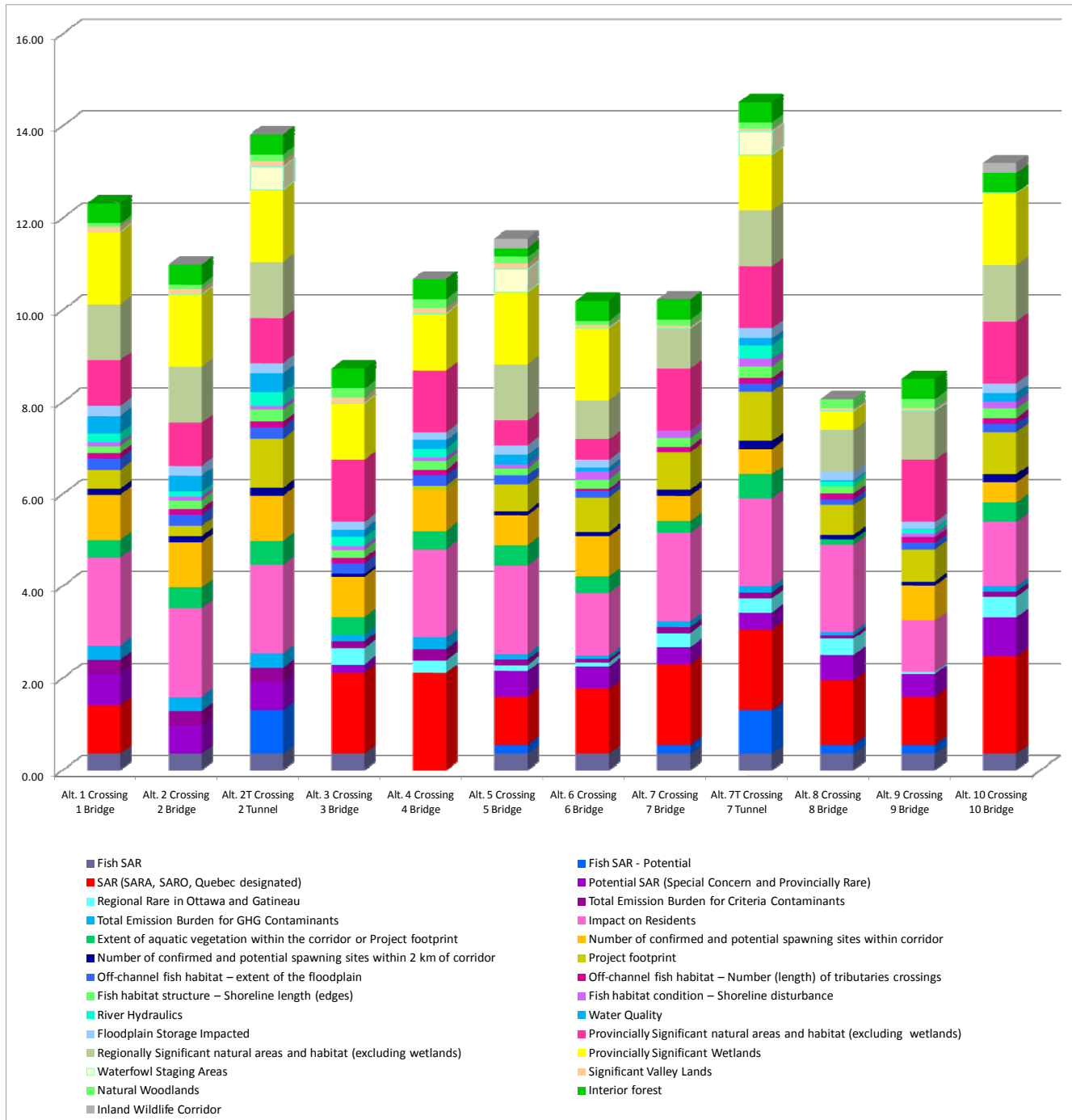


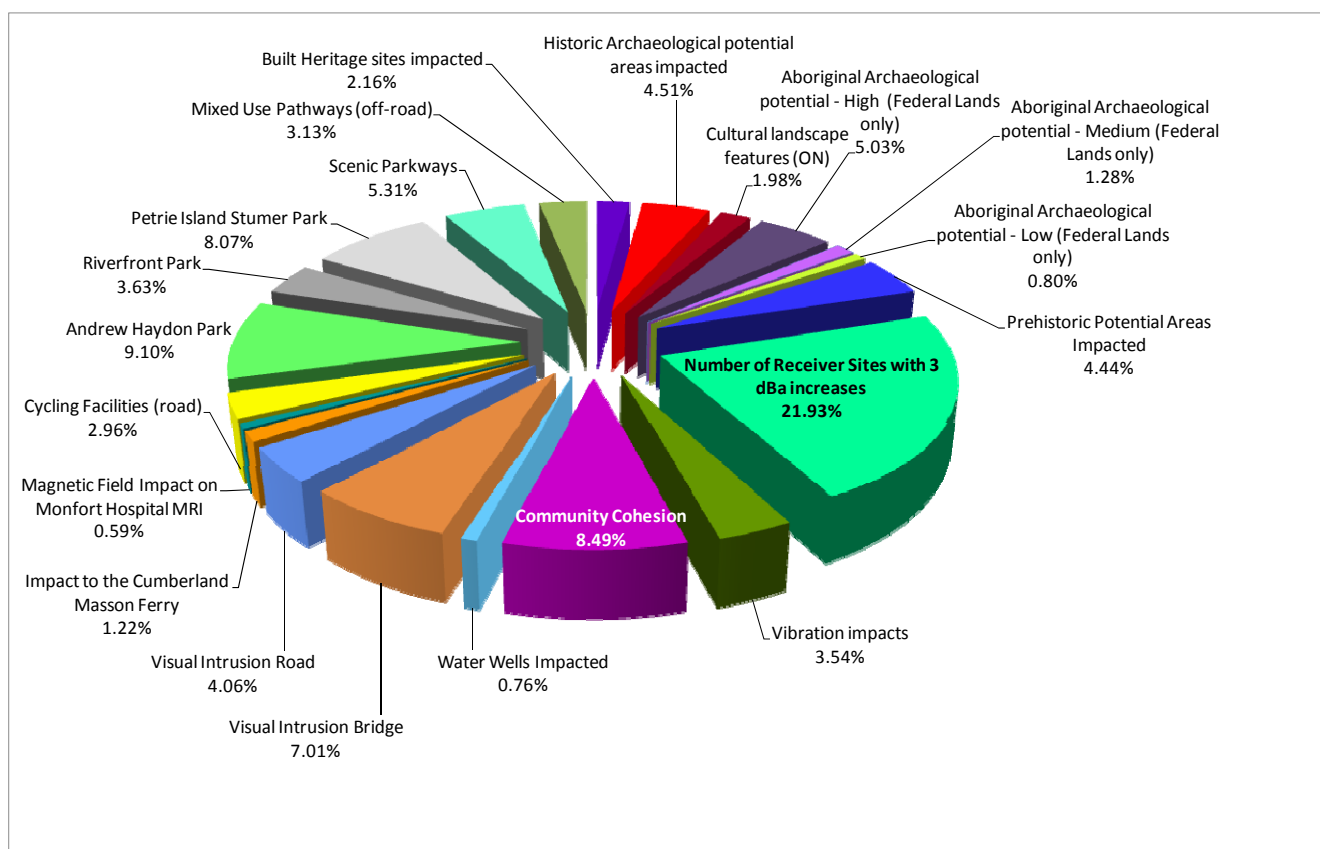
Figure 13
Results of the Natural Environment Weighted Scores



9.2.3 Cultural Environment

The Cultural Environment factor group was allocated an average of approximately nine percent of the total weight of the factor groups. However, many sub-factors related to effects on people and communities were included in other factor groups, so the Evaluation Committee allocated the associated weight to these effects under other factor groups. The breakdown of Cultural Environment sub-factor weights is shown in **Figure 14**, Cultural Environment Sub-factor Weights.

Figure 14
Cultural Environment Sub-factor Weights

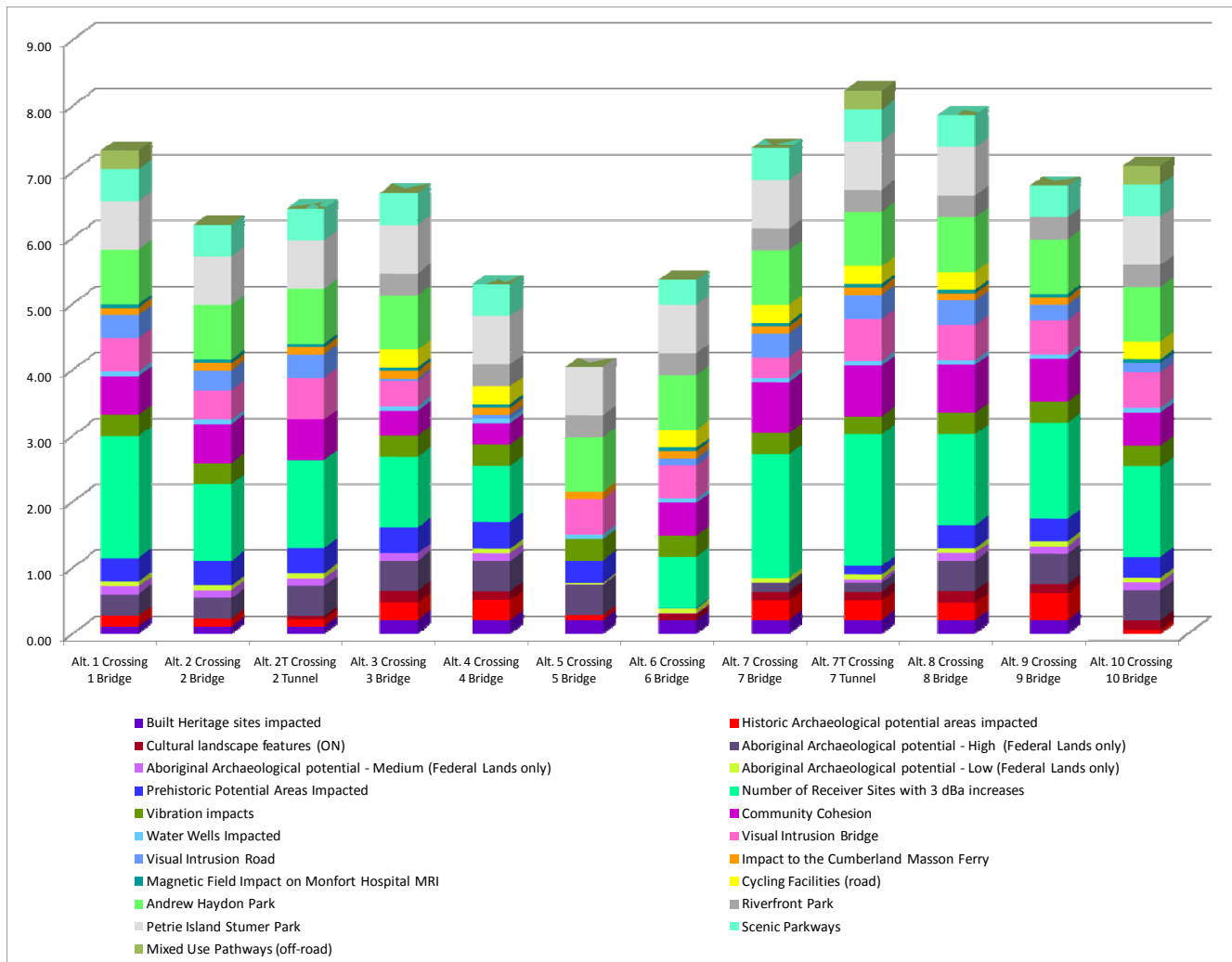


The highest weighted sub-factor in this factor group was the Number of Receiver Sites with 3 dBA Increases (increase in noise level); Alternative 7T scored the highest with the least number of receiver sites. The second-highest weighted sub-factor was the Andrew Haydon Park sub-factor (affect on use of the park) where all the alternatives, except Alternative 4 scored well. The third-highest weighted sub-factor was Community Cohesion where alternatives 7 and 7T had the least impact and scored well because they do not divide existing communities. Alternatives 3, 4, and 5 scored the lowest under Community Cohesion due to the extent to which these alternatives would divide existing communities.

Alternative 7T received consistently high scores in the top three Cultural Environment sub-factors and was the best performing alternative overall for the Cultural Environment factor group. The poorest performing alternatives in this factor group were alternatives 4, 5, and 6, with Kettle Island having the lowest score.

The performance of all alternatives in the Cultural Environment factor group is illustrated in **Figure 15**, Results of the Cultural Environment Weighted Scores.

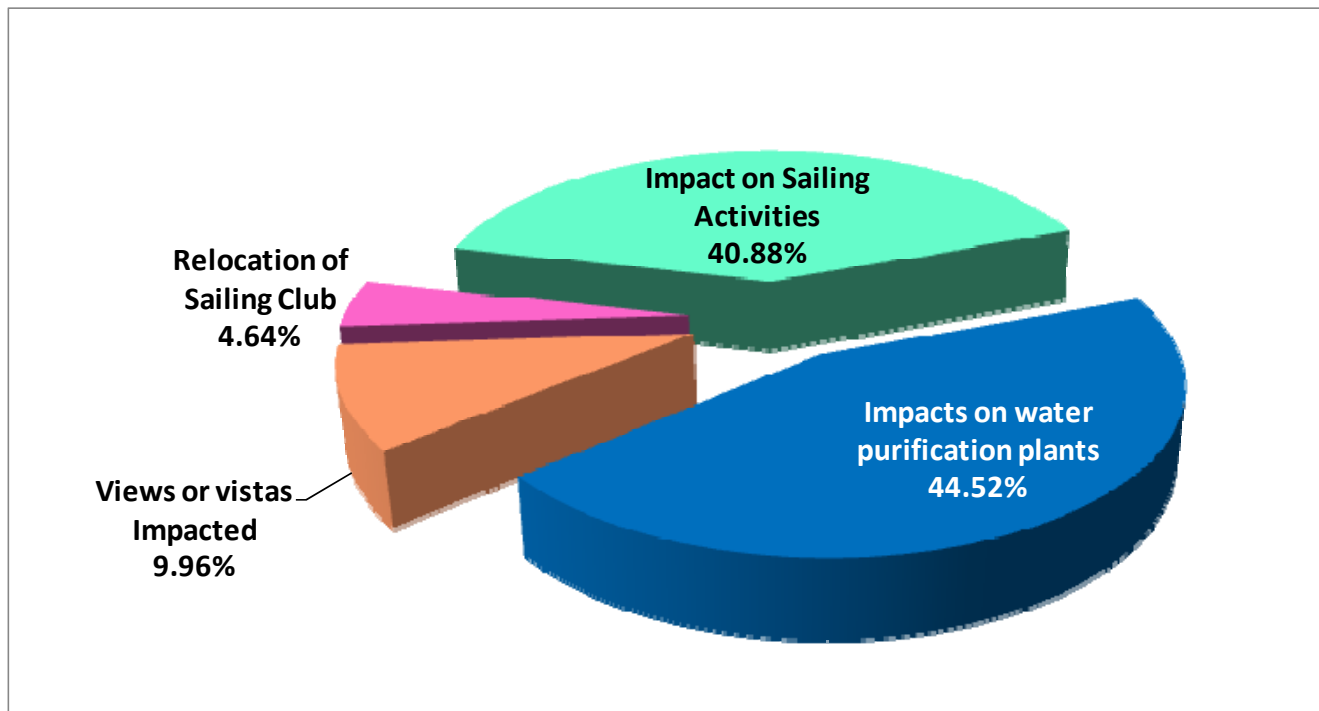
Figure 15
Results of the Cultural Environment Weighted Scores



9.2.4 Water Use and Resources

The Water Use and Resources factor group was allocated approximately 4.5 percent of the total weight among factor groups. The breakdown of Water Use and Resources sub-factor weights are shown on **Figure 16**, Water Use and Resources Sub-factor Weights.

Figure 16
Water Use and Resources Sub-factor Weights



The highest weighted sub-factor in this factor group was Impacts on Water Purification Plants, with alternatives 2T and 6 to 10 scoring the highest with no impacts on water treatment plants. The second-highest weighted sub-factor was impacts on Sailing Activities where alternatives 2T and 7T scored well. The third highest criterion was Views or Vistas Impacted where, again, alternatives 2T and 7T all had the least impact and scored well. Alternatives 3, 4, and 5 scored the lowest under Water Use and Resources due to their proximity to a Water Purification Plant, Kettle Island being the closest.

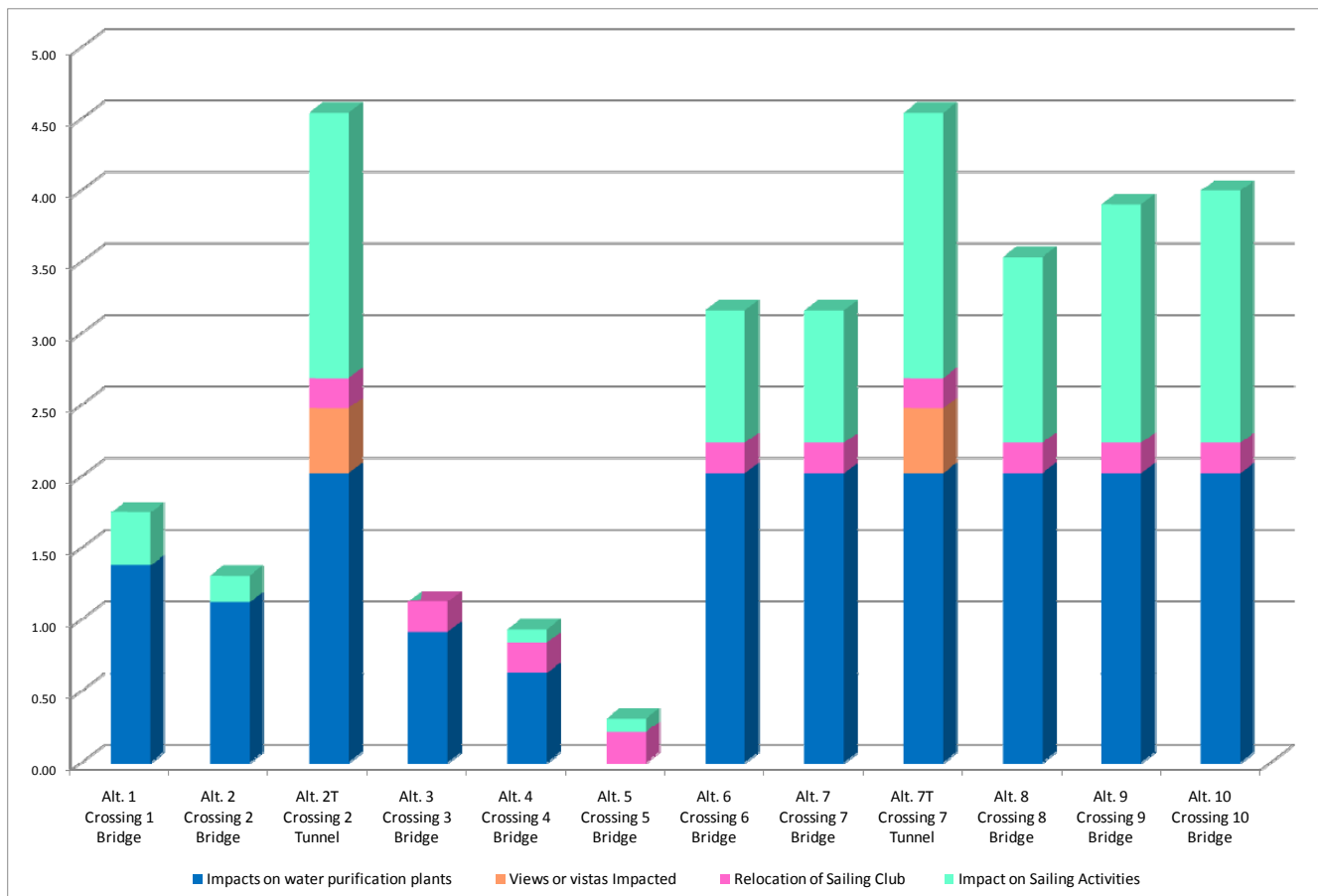
Alternatives 2T and 7T received consistently high scores in the top three Water Use and Resources sub-factors and were the best performing alternatives overall for the factor group. The poorest performing alternatives under this factor group were alternatives 3, 4, and 5, with Kettle Island having the lowest score.

The impacts on sailing activities could be eased by lengthening the bridge spans to set the piers outside the navigational channel limits to permit unobstructed sailing activities. This action would be less applicable to alternatives 3 and 4 due to the 3.8 km- and 3.4 km-wide stretch of open water. The

Kettle Island alternative would travel two shorter distances over the Ottawa River at approximately 1.0 km and 0.35 km sections where this mitigation strategy is achievable, but with a higher cost. The water treatment plants potentially affected by contamination from the water crossing are the Britannia facility in Ottawa and the Aylmer and Gatineau facilities in Quebec. The Kettle Island crossing is the closest of all the alternatives to a water intake facility. This location is potentially affected by the 0.35 km crossing over the north channel of the Ottawa River located approximately 0.6 km upstream of the Gatineau facility. The Study Team believes there is a reasonable chance that measures to reduce or negate the potential for contamination could be implemented to capture hazardous substances before entering the river environment.

The performance of all alternatives in the Water Use and Resources Factor Group is illustrated in Figure 17, Results of the Water Use and Resources Weighted Scores.

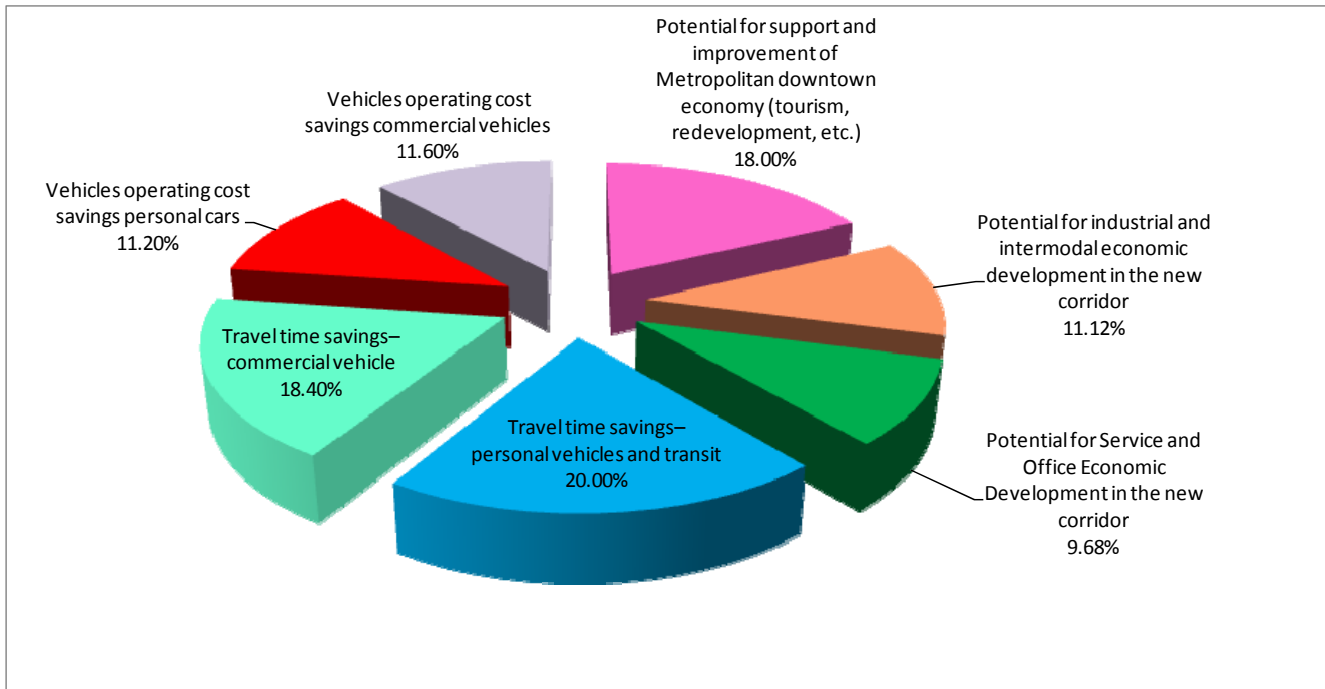
Figure 17
Results of the Water Use and Resources Weighted Scores



9.2.5 Socio-Economic Environment

The Socio-Economic Environment factor group was allocated approximately 6.8 percent of the total weight of the factor groups. The breakdown of Socio-Economic Environment sub-factor weights is shown in **Figure 18**, Socio-Economic Environment Sub-factor Weighted Scores.

Figure 18
Socio-Economic Environment Sub-factor Weighted Scores



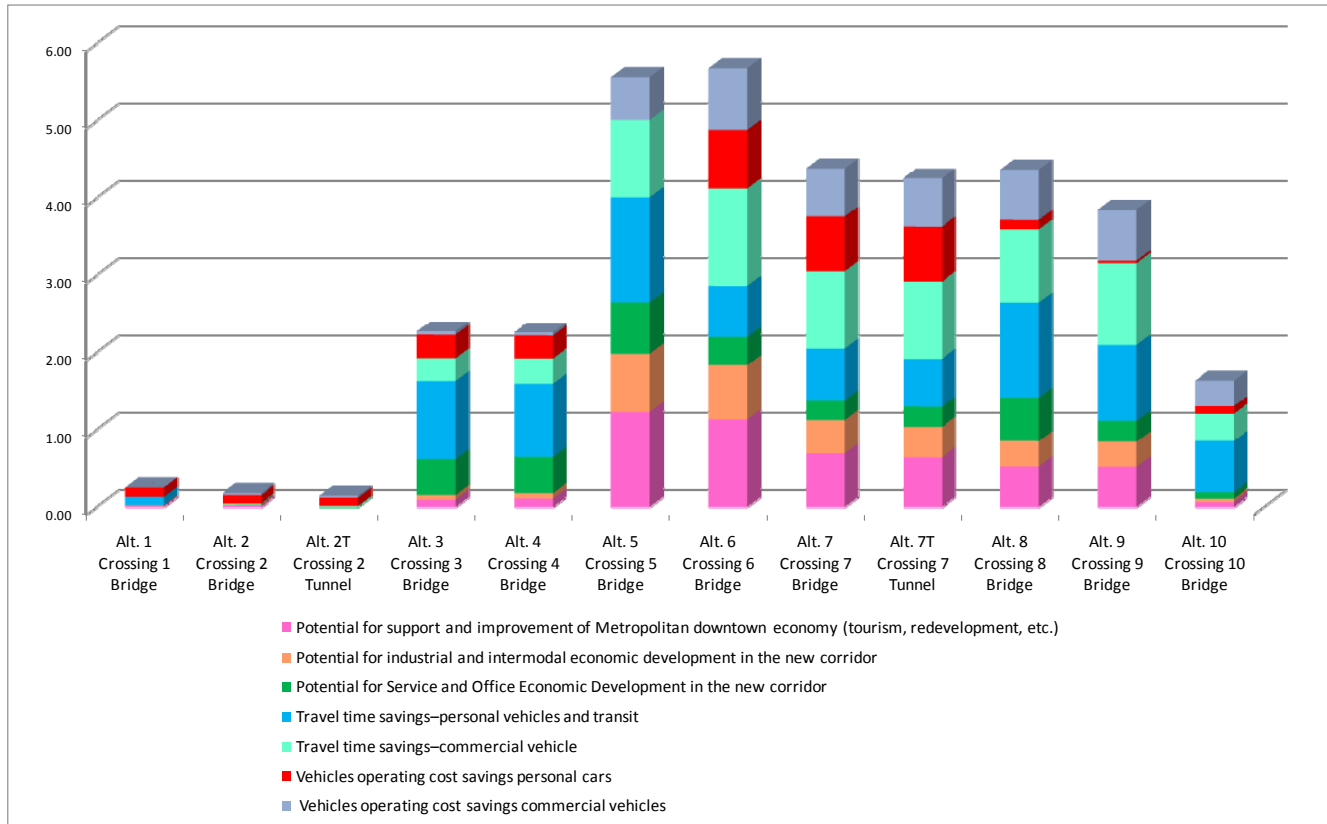
The sub-factor group Travel Time Savings–Personal Vehicles and Transit was allocated the highest sub-factor weight, with Kettle Island receiving the highest score. The second-highest weighted sub-factor was Travel Time Savings–Commercial Vehicles, with Alternative 6 scoring the highest. Potential for Support and Improvement of Metropolitan Downtown Economy (tourism, redevelopment, etc.) was given the third-highest weight, with Kettle Island scoring the highest.

The alternative with the highest measurement for two of the top three sub-factors described above was Alternative 5 Kettle Island. The alternative with the highest score in one out of three of the highest weighted criteria was Alternative 6 Duck Island. Kettle Island scored the lowest overall for personal vehicle cost savings.

The poorest performing alternatives in this factor group were alternatives 1, 2 and 2T.

The performance of all alternatives in the Socio-Economic Factor Group is illustrated in **Figure 19**, Results of the Socio-Economic Weighted Scores.

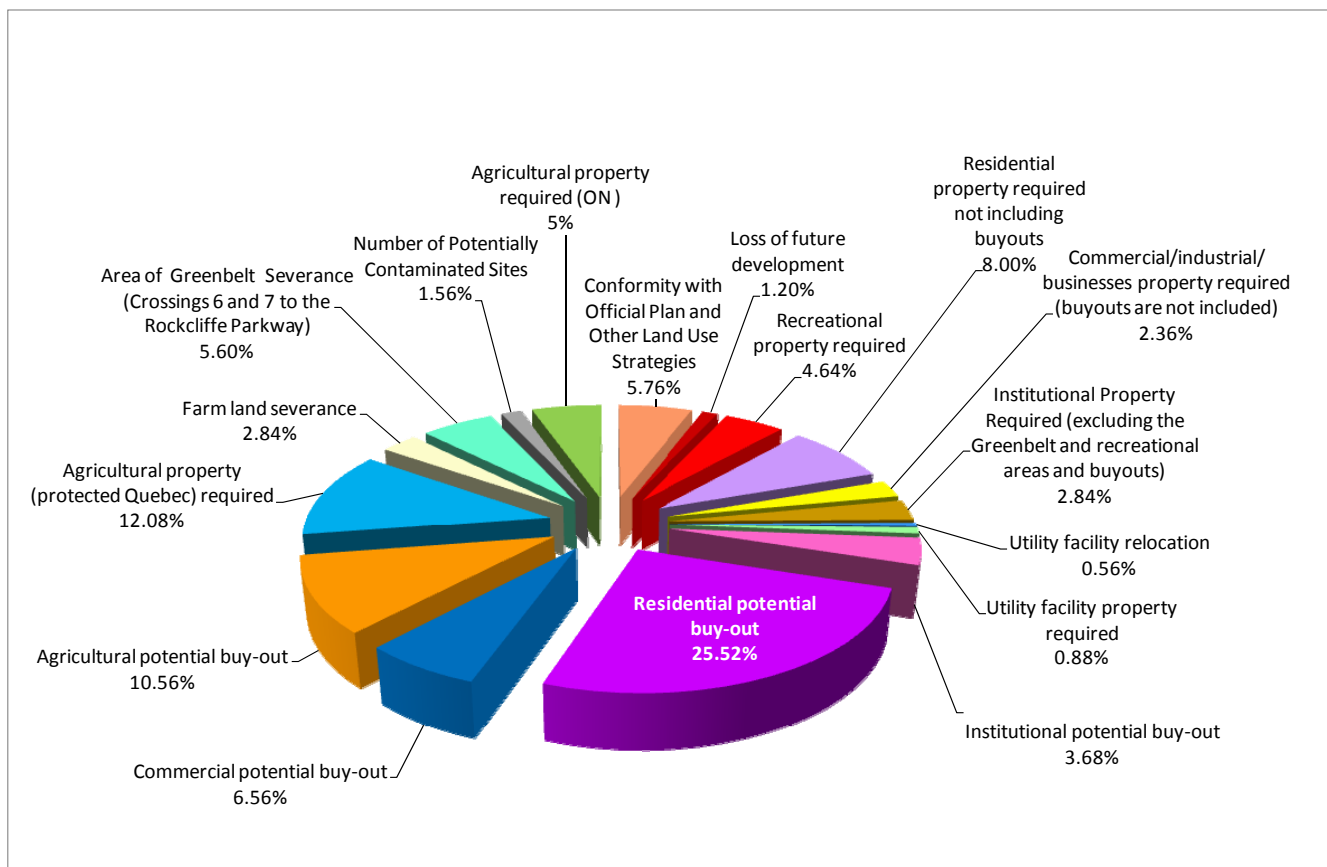
Figure 19
Results of the Socio-Economic Weighted Scores



9.2.6 Land Use and Property

The Evaluation Committee assigned the Land Use and Property Factor Group a weight of approximately 8.2 percent of the total weight of the factor groups. The breakdown of Land Use and Property sub-factor weights is shown in **Figure 20**, Land Use and Property Sub-factor Weighted Scores.

Figure 20
Land Use and Property Sub-factor Weighted Scores



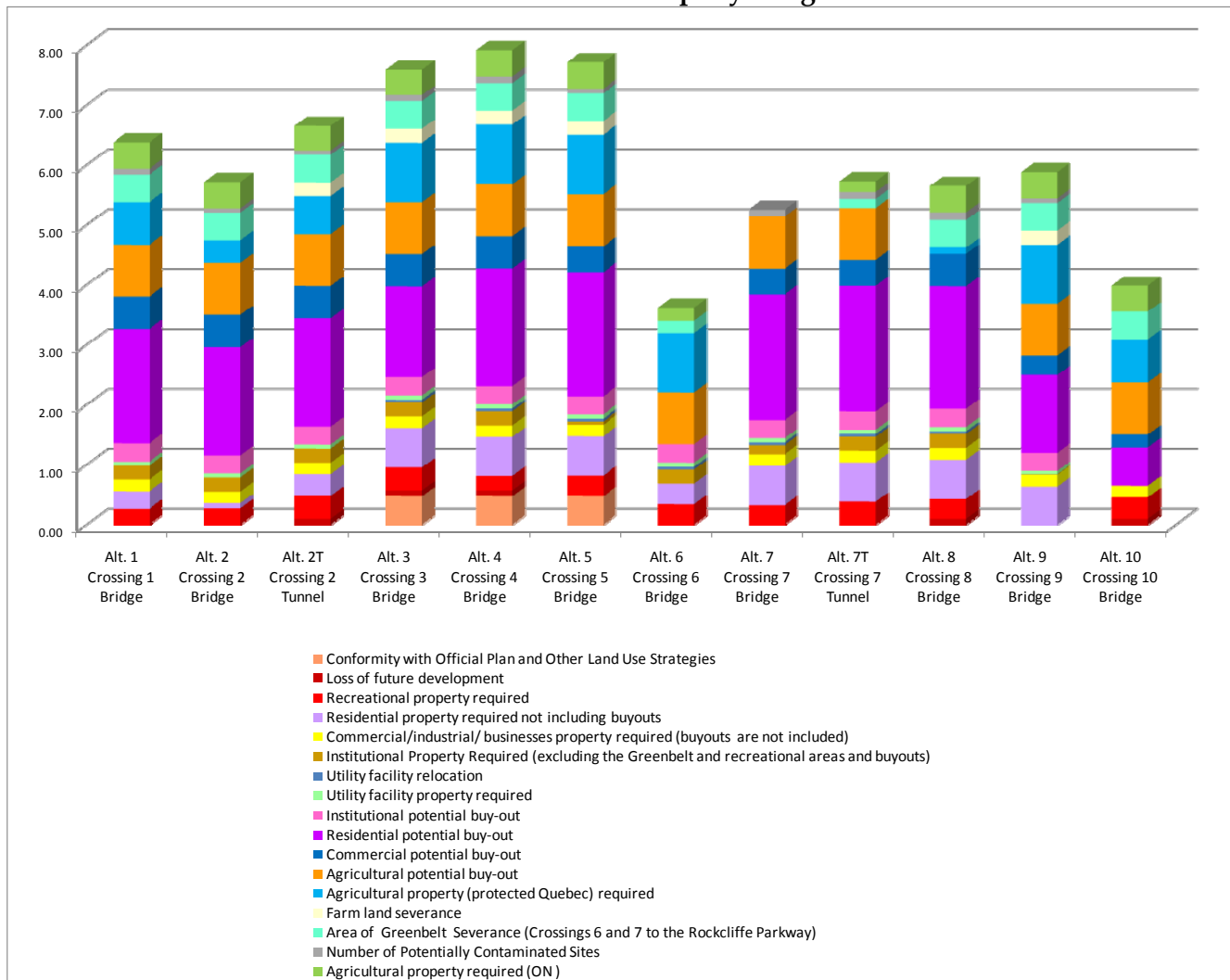
The sub-factor Residential Potential Buy-Out was allocated the highest weight, with alternatives 7 and 7T receiving the highest scores with no required residential buyouts. The second-highest weighted sub-factor was Agricultural Property (Protected in Quebec) Required, with alternatives 3 to 6 scoring the highest and alternatives 7 and 7T scoring the lowest (meaning they would have an effect on protected agricultural property) The third highest weighted sub-factor was Agricultural Potential

Buy-Out, with all alternatives, except Alternative 8 scoring high. Alternative 8 scored poorly due to an active farm in the area, with a possible buyout of farm buildings required.

The alternative with the highest score for Land Use and Property sub-factors was Alternative 4; however, it did not score well under Recreational Property Required and Residential Potential Buy-Out. The poorest performing alternatives in this factor group were alternatives 6, 10, and 7.

The performance of all alternatives in the Land Use and Property Factor Group is illustrated in **Figure 21**, Results of the Land Use and Property Weighted Scores.

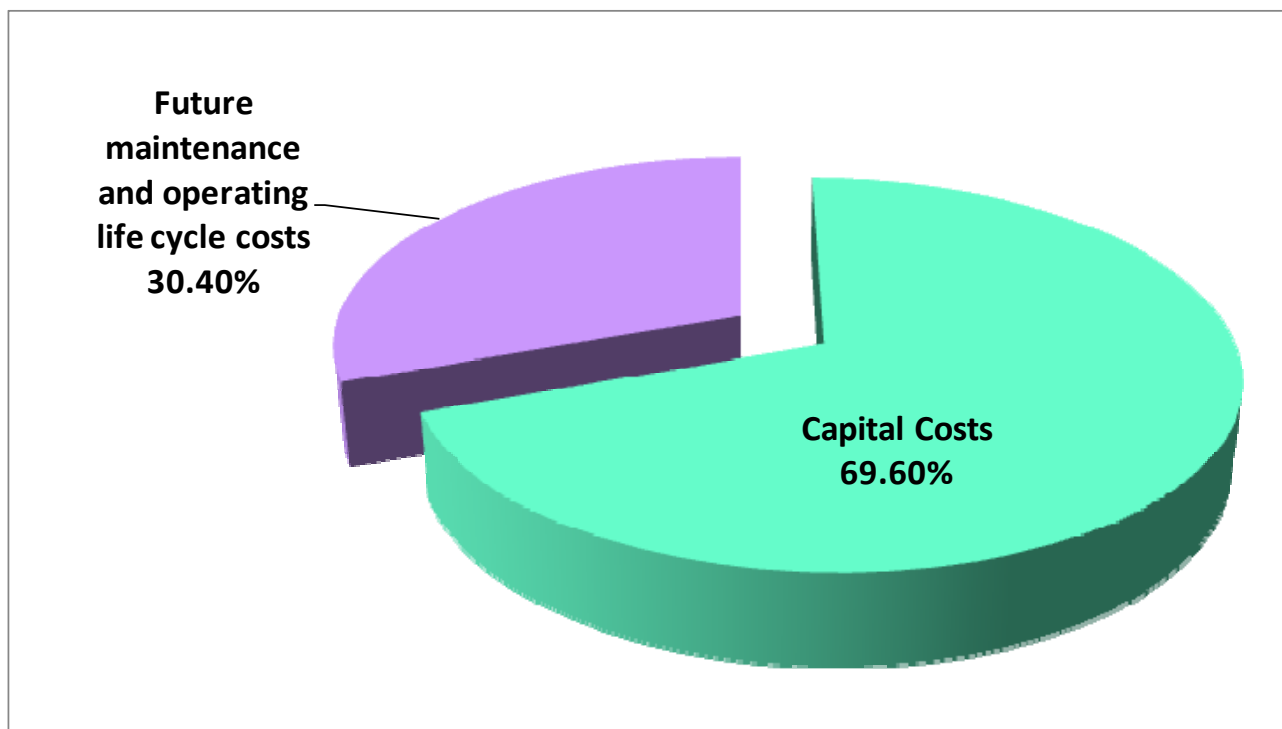
Figure 21
Results of the Land Use and Property Weighted Scores



9.2.7 Cost

The Evaluation Committee assigned the Cost factor group approximately 25.5 percent of the total weight of the factor groups – the second most for any one factor. The breakdown of the Costs sub-factor weights is shown in **Figure 22**, Cost Sub-factor Weighted Scores.

Figure 22
 Cost Sub-factor Weighted Scores

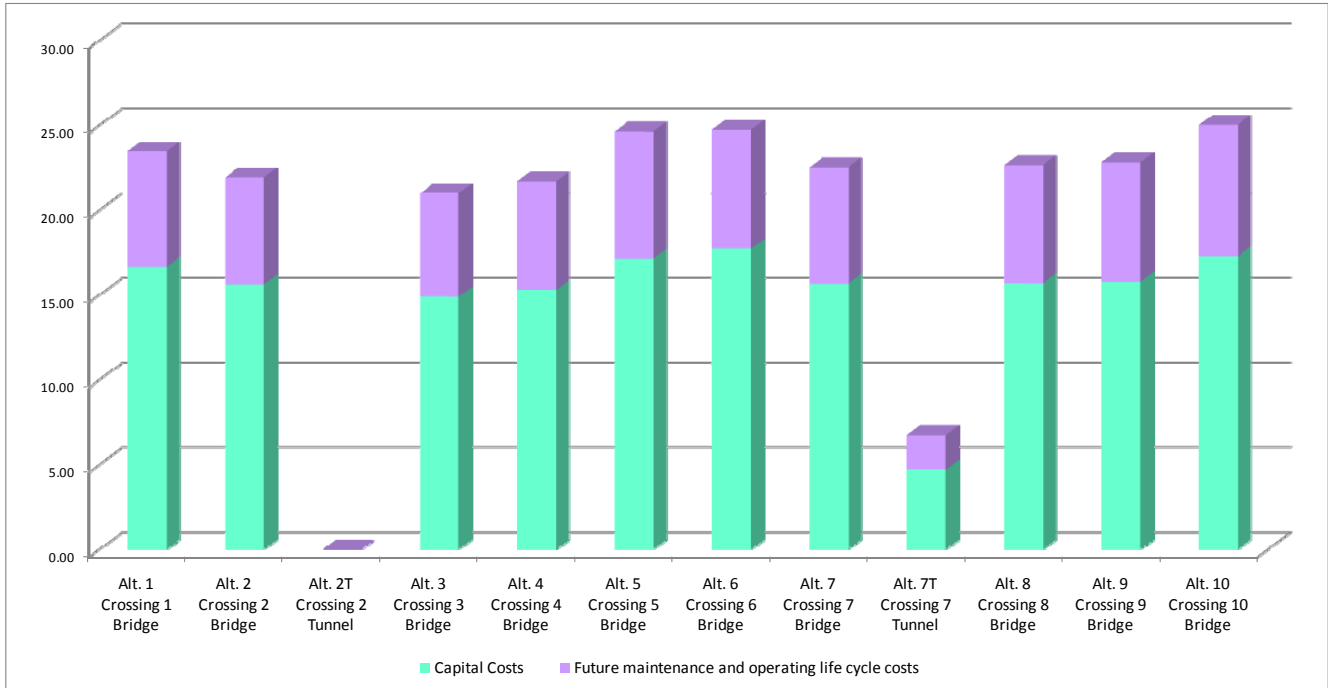


Capital Cost was allocated almost 70 percent of the total of the two sub-factors in this group. Alternative 6, which would cost the least, scored the highest in this sub-factor. Alternatives 10 and 5 had the next highest scores, since they were the second and third least costly crossings. Alternative 10 was the highest scoring crossing for Future Maintenance and Operating Life Cycle Costs, with alternatives 6 and 5 the second and third, respectively.

The alternative with the highest score for the two sub-factors in this factor group was Alternative 6, Duck Island. The poorest performing alternatives in this factor group were alternatives 2T and 7T.

The performance of all alternatives in the Cost factor group is illustrated in **Figure 23**, Results of the Cost Weighted Scores.

Figure 23
 Results of the Cost Weighted Scores



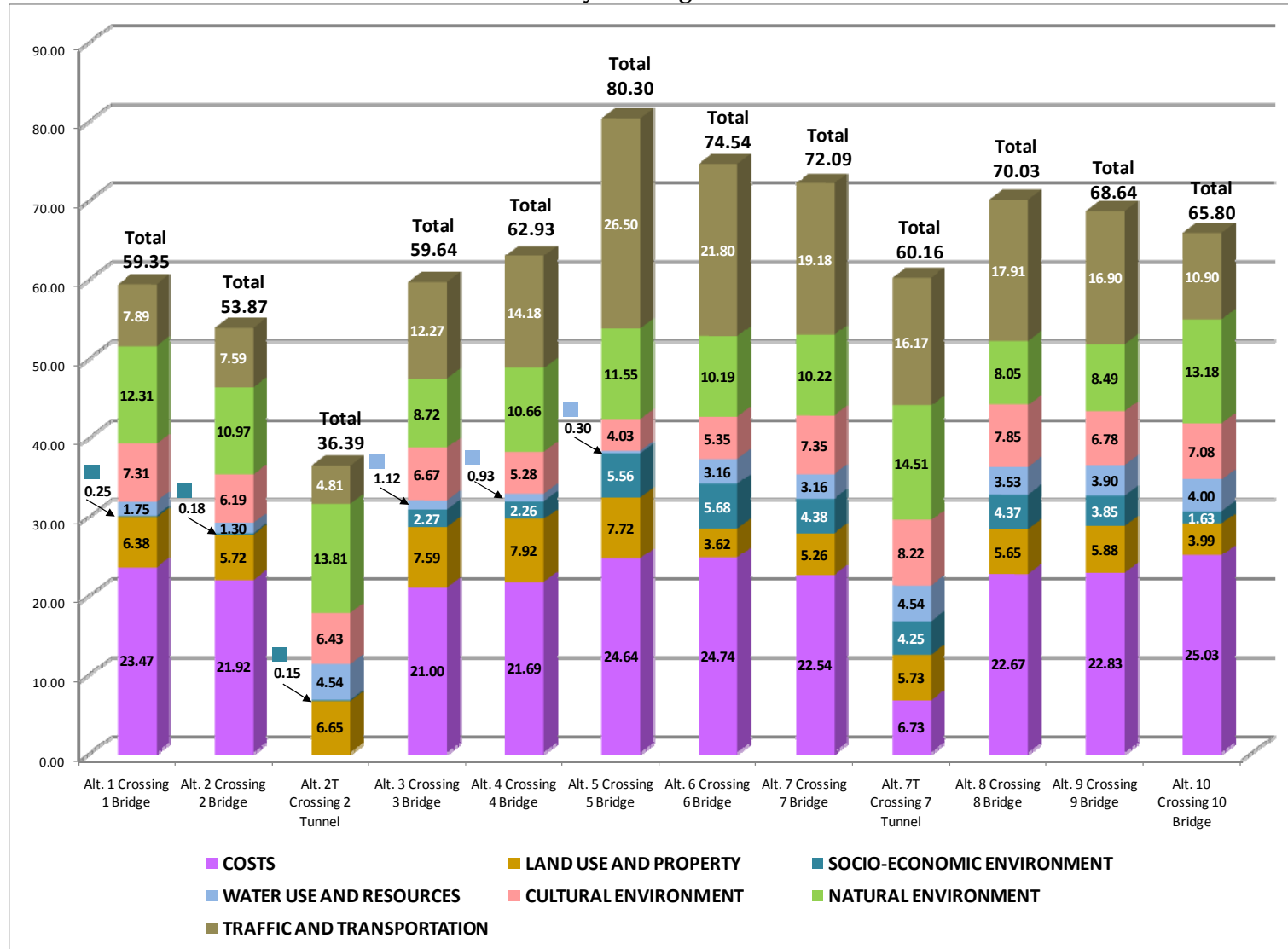
9.2.8 Summary of Alternative Ratings

The alternative with the highest overall score was Kettle Island (refer to **Figure 24**, Summary of Weighted Scores) because it satisfied the Traffic and Transportation and Socio-Economic Environment goals of the study, received a mid to high score for most of the factor groups, and has a relatively lower cost compared to the other 11 alternatives. There is a noise and visual intrusion trade-off at this crossing location, as demonstrated by lower scores under the Cultural Environment sub-factors. These scores were due to the introduction of additional traffic and associated noise in the area, which currently has lower ambient sound levels. The scores were also affected by introducing unobstructed views for a high number of residents within 200 metres of the roadway. In addition, the Kettle Island crossing scored the lowest under the Water Use and Resources factor group, due to the close proximity upstream of the Gatineau Water Purification Plant and the potential effect on sailing activities in the lower reach of the Ottawa River. However, overall Kettle Island scored the highest out of all 12 alternatives and was recommended to be carried forward as the Technically Preferred Alternative. Trade-offs will be examined in Phase 2 of the EA, which will refine the Technically Preferred Alternative to address negative environmental effects.

Alternative 6, the Duck Island corridor, had the second-highest overall score. It scored the highest for Socio-Economic Environment and the second-highest for Traffic and Transportation and the highest for Cost compared to the other 11 alternatives. It had a mid-range score for Water Use and Resources (because it is further downstream of the Gatineau Water Purification Plant) and for Natural Environment; however, it scored low for Land Use and Property as well as Cultural Environment. Trade-offs at this crossing location include the Land Use and Property sub-factor “Potential Residential Buy-outs” (since the introduction of a 4-lane roadway along Boulevard Lorain in Gatineau would require 79 buyouts) and the Cultural Environment factor, due to potential impacts to heritage and archaeological features.

The Gatineau Airport/Baie McLaurin corridor (Alternative 7) had the third-highest overall score. It placed second for Socio-Economic Environment and third for Traffic and Transportation as well as for Cultural Environment. It had a mid-range score for Water Use and Resources because it is downstream of the Gatineau Water Purification Plant; however, it scored low for Natural Environment as well as for Land Use and Property. Trade-offs at this crossing location included all of the Hydrotechnical sub-factors where there is an introduction of a 4-lane roadway across Baie McLaurin impacting the river hydraulics, water quality, and floodplain storage to a greater extent than the other corridors. Impacts on agricultural resources also were higher for this alternative due to farm buyouts, protected agricultural property in Quebec, and farm land severances.

Figure 24
Summary of Weighted Scores



9.3 SENSITIVITY TESTING

The Consultant conducted sensitivity testing to assess how sensitive the outcome was to the range of weights assigned by the Evaluation Committee members. This testing exercise considered the diversity of perspectives amongst members of the committee on the importance of each criterion and whether the assigned weights are subject to a large or small standard deviation. This testing allows greater confidence in the selection process and reduces the potential that the average weight of the group could bias the outcome of the evaluation.

A frequent criticism of other commonly used evaluation methods is that their outcome is biased by the selection of people on the project team that establish the weights. For example, a project team composed primarily of transportation specialists could bias the outcome towards an alternative which had strong transportation technical merits. To address this potential pitfall:

1. the Evaluation Committee included a diverse group of engineers, planners, and environmental specialists; and
2. these professionals were balanced from among the federal government, both provinces, both cities, and agency participants (including CREDO and Transport 2000).

After the weighting exercise, a series of sensitivity tests were undertaken to consider the spectrum of opinions in the group by looking at the highest or lowest weights (opinion of importance) proposed by any one Evaluation Committee member. The tests were undertaken by placing greater or less emphasis on a factor and redistributing the weight to the other factors using the average values of the Evaluation Committee. In this way, all reported scores are presented out of a total of 100 (or reflect percentages).

Tests were completed for each factor group using the highest weight given by anyone in the Evaluation Committee, as well as the lowest weight, to assess how sensitive the outcome was with respect to that factor as an independent variable. The change in the weight to the test factor group was redistributed to or from the remainder factor groups to maintain a total weight of 100 percent among factor groups. For example, if the average weight was 29 percent for Traffic and Transportation and the test was for the highest weight given to Traffic and Transportation (43 percent), then 14 percent was redistributed from the other six factor groups according to their original percentage of the total. Conversely for the lowest weight test, the change in weight was added according to their original weight.

Following this methodology, a series of tests were completed varying the weight for each factor. **Table 7**, Averaged Evaluation Committee Weight and Summary of Weighted Scores provides a summary of the Evaluation Committee's averaged weight for reference and **Tables 8-14** illustrate the sensitivity tests for each factor group.

Table 7
Averaged Evaluation Committee Weight and Summary of Weighted Scores

FACTORS	WEIGHT	Corridor 1	Corridor 2	Corridor 2T	Corridor 3	Corridor 4	Corridor 5	Corridor 6	Corridor 7	Corridor 7T	Corridor 8	Corridor 9	Corridor 1
TRAFFIC AND TRANSPORTATION	29%	7.89	7.59	4.81	12.27	14.18	26.50	21.80	19.18	16.17	17.91	16.90	10.90
NATURAL ENVIRONMENT	17%	12.31	10.97	13.81	8.72	10.66	11.55	10.19	10.22	14.51	8.05	8.49	13.18
CULTURAL ENVIRONMENT	9%	7.31	6.19	6.43	6.67	5.28	4.03	5.35	7.35	8.22	7.85	6.78	7.08
WATER USE AND RESOURCES	5%	1.75	1.30	4.54	1.12	0.93	0.30	3.16	3.16	4.54	3.53	3.90	4.00
SOCIO-ECONOMIC ENVIRONMENT	7%	0.25	0.18	0.15	2.27	2.26	5.56	5.68	4.38	4.25	4.37	3.85	1.63
LAND USE AND PROPERTY	8%	6.38	5.72	6.65	7.59	7.92	7.72	3.62	5.26	5.73	5.65	5.88	3.99
COSTS	25%	23.47	21.92	0.00	21.00	21.69	24.64	24.74	22.54	6.73	22.67	22.83	25.03
Corridor Score	100%	59.35	53.87	36.39	59.64	62.93	80.30	74.54	72.09	60.16	70.03	68.64	65.80
EVALUATION COMMITTEE	Ranking	10	11	12	9	7	1	2	3	8	4	5	6

Table 8
Sensitivity Test No. 1 and 2 Traffic and Transportation – High and Low Tests

		Corridor 1	Corridor 2	Corridor 2T	Corridor 3	Corridor 4	Corridor 5	Corridor 6	Corridor 7	Corridor 7T	Corridor 8	Corridor 9	Corridor 10
1. TRAFFIC AND TRANSPORTATION - HIGH 43%													
TRAFFIC AND TRANSPORTATION	43%	11.89	11.44	7.25	18.49	21.38	39.95	32.87	28.92	24.38	27.00	25.48	16.44
NATURAL ENVIRONMENT	14%	9.82	8.75	11.01	6.95	8.50	9.21	8.13	8.15	11.57	6.42	6.77	10.51
CULTURAL ENVIRONMENT	7%	5.83	4.93	5.13	5.32	4.21	3.21	4.26	5.86	6.55	6.26	5.41	5.64
WATER USE AND RESOURCES	4%	1.39	1.04	3.62	0.90	0.74	0.24	2.52	2.52	3.62	2.82	3.11	3.19
SOCIO-ECONOMIC ENVIRONMENT	5%	0.20	0.14	0.12	1.81	1.80	4.44	4.53	3.50	3.39	3.48	3.07	1.30
LAND USE AND PROPERTY	7%	5.09	4.56	5.31	6.05	6.31	6.15	2.89	4.19	4.57	4.51	4.69	3.18
COSTS	20%	18.72	17.48	0.00	16.75	17.30	19.65	19.73	17.97	5.37	18.08	18.20	19.96
TOTAL	100%	52.93	48.35	32.43	56.27	60.25	82.86	74.93	71.11	59.46	68.56	66.74	60.22
RANKING		10	11	12	9	6	1	2	3	8	4	5	7
2. TRAFFIC AND TRANSPORTATION - LOW 15%													
TRAFFIC AND TRANSPORTATION	15%	4.15	3.99	2.53	6.45	7.46	13.94	11.47	10.09	8.50	9.42	8.89	5.73
NATURAL ENVIRONMENT	21%	14.64	13.05	16.42	10.37	12.68	13.73	12.12	12.15	17.25	9.57	10.10	15.68
CULTURAL ENVIRONMENT	11%	8.69	7.36	7.65	7.93	6.28	4.79	6.36	8.74	9.77	9.33	8.06	8.42
WATER USE AND RESOURCES	5%	2.08	1.55	5.40	1.34	1.10	0.36	3.76	3.76	5.40	4.20	4.64	4.75
SOCIO-ECONOMIC ENVIRONMENT	8%	0.30	0.21	0.17	2.70	2.69	6.62	6.75	5.21	5.06	5.20	4.58	1.94
LAND USE AND PROPERTY	10%	7.59	6.80	7.91	9.03	9.42	9.18	4.31	6.25	6.82	6.72	7.00	4.74
COSTS	30%	27.91	26.07	0.00	24.98	25.80	29.30	29.42	26.80	8.01	26.96	27.15	29.76
TOTAL	100%	65.35	59.03	40.08	62.79	65.43	77.91	74.18	73.00	60.81	71.40	70.41	71.02
RANKING		8	11	12	9	7	1	2	3	10	4	6	5

Table 9
Sensitivity Test No. 3 and 4 Natural Environment - High and Low Tests

		Corridor 1	Corridor 2	Corridor 2T	Corridor 3	Corridor 4	Corridor 5	Corridor 6	Corridor 7	Corridor 7T	Corridor 8	Corridor 9	Corridor 10
3.NATURAL ENVIRONMENT - HIGH 45%													
TRAFFIC AND TRANSPORTATION	19%	5.25	5.05	3.20	8.16	9.43	17.63	14.50	12.76	10.76	11.91	11.24	7.25
NATURAL ENVIRONMENT	45%	31.98	28.51	35.88	22.65	27.70	30.01	26.49	26.56	37.70	20.92	22.07	34.25
CULTURAL ENVIRONMENT	6%	4.86	4.12	4.28	4.43	3.52	2.68	3.56	4.89	5.47	5.22	4.51	4.71
WATER USE AND RESOURCES	3%	1.16	0.87	3.02	0.75	0.62	0.20	2.10	2.10	3.02	2.35	2.60	2.66
SOCIO-ECONOMIC ENVIRONMENT	5%	0.17	0.12	0.10	1.51	1.50	3.70	3.78	2.92	2.83	2.91	2.56	1.09
LAND USE AND PROPERTY	5%	4.24	3.81	4.43	5.05	5.27	5.13	2.41	3.50	3.81	3.76	3.91	2.65
COSTS	17%	15.61	14.58	0.00	13.97	14.43	16.39	16.46	14.99	4.48	15.08	15.19	16.65
TOTAL	100%	63.27	57.05	50.90	56.53	62.47	75.74	69.29	67.71	68.06	62.15	62.08	69.26
RANKING		6	10	12	11	7	1	2	5	4	8	9	3
4.NATURAL ENVIRONMENT - LOW 7%													
TRAFFIC AND TRANSPORTATION	32%	8.87	8.53	5.41	13.80	15.95	29.81	24.52	21.58	18.19	20.14	19.01	12.26
NATURAL ENVIRONMENT	7%	4.97	4.44	5.58	3.52	4.31	4.67	4.12	4.13	5.86	3.25	3.43	5.33
CULTURAL ENVIRONMENT	10%	8.22	6.96	7.23	7.50	5.94	4.53	6.02	8.26	9.24	8.82	7.63	7.96
WATER USE AND RESOURCES	5%	1.96	1.47	5.11	1.26	1.04	0.34	3.55	3.55	5.11	3.97	4.39	4.49
SOCIO-ECONOMIC ENVIRONMENT	8%	0.28	0.20	0.16	2.56	2.54	6.26	6.39	4.93	4.78	4.92	4.33	1.84
LAND USE AND PROPERTY	9%	7.17	6.43	7.48	8.54	8.91	8.68	4.07	5.91	6.45	6.36	6.62	4.48
COSTS	29%	26.40	24.66	0.00	23.62	24.40	27.71	27.83	25.35	7.58	25.50	25.68	28.15
TOTAL	100%	57.89	52.69	30.98	60.80	63.10	82.00	76.50	73.72	57.21	72.97	71.09	64.52
RANKING		9	11	12	8	7	1	2	3	10	4	5	6

Table 10
Sensitivity Test No. 5 and 6 Cultural Environment - High and Low Tests

		Corridor 1	Corridor 2	Corridor 2T	Corridor 3	Corridor 4	Corridor 5	Corridor 6	Corridor 7	Corridor 7T	Corridor 8	Corridor 9	Corridor 10
5.CULTURAL ENVIRONMENT - HIGH 22%													
TRAFFIC AND TRANSPORTATION	24%	6.77	6.51	4.13	10.52	12.17	22.74	18.71	16.46	13.88	15.37	14.50	9.35
NATURAL ENVIRONMENT	15%	10.56	9.42	11.85	7.48	9.15	9.91	8.75	8.77	12.45	6.91	7.29	11.31
CULTURAL ENVIRONMENT	22%	17.67	14.96	15.54	16.12	12.78	9.74	12.93	17.76	19.87	18.97	16.39	17.11
WATER USE AND RESOURCES	4%	1.50	1.12	3.90	0.96	0.80	0.26	2.71	2.71	3.90	3.03	3.35	3.43
SOCIO-ECONOMIC ENVIRONMENT	6%	0.21	0.15	0.12	1.95	1.94	4.77	4.87	3.76	3.65	3.75	3.30	1.40
LAND USE AND PROPERTY	7%	5.47	4.91	5.71	6.51	6.80	6.62	3.11	4.51	4.92	4.85	5.05	3.42
COSTS	22%	20.14	18.81	0.00	18.02	18.61	21.14	21.23	19.34	5.78	19.45	19.59	21.47
TOTAL	100%	62.33	55.88	41.25	61.57	62.24	75.19	72.30	73.32	64.44	72.33	69.47	67.50
RANKING		8	11	12	10	9	1	4	2	7	3	5	6
6.CULTURAL ENVIRONMENT - LOW 3%													
TRAFFIC AND TRANSPORTATION	30%	8.41	8.10	5.13	13.09	15.13	28.28	23.26	20.47	17.26	19.11	18.03	11.63
NATURAL ENVIRONMENT	18%	13.13	11.71	14.73	9.30	11.38	12.32	10.88	10.91	15.48	8.59	9.06	14.07
CULTURAL ENVIRONMENT	3%	2.41	2.04	2.12	2.20	1.74	1.33	1.76	2.42	2.71	2.59	2.24	2.33
WATER USE AND RESOURCES	5%	1.86	1.39	4.84	1.20	0.99	0.32	3.37	3.37	4.84	3.77	4.16	4.26
SOCIO-ECONOMIC ENVIRONMENT	7%	0.27	0.19	0.16	2.43	2.41	5.94	6.06	4.68	4.54	4.66	4.11	1.74
LAND USE AND PROPERTY	9%	6.81	6.10	7.10	8.10	8.45	8.23	3.86	5.61	6.12	6.03	6.28	4.25
COSTS	27%	25.05	23.39	0.00	22.41	23.15	26.29	26.40	24.05	7.19	24.19	24.36	26.71
TOTAL	100%	57.94	52.93	34.09	58.73	63.25	82.72	75.60	71.51	58.13	68.94	68.25	65.00
RANKING		10	11	12	8	7	1	2	3	9	4	5	6

Table 11
Sensitivity Test No. 7 and 8 Water Use and Resources - High and Low Tests

		Corridor 1	Corridor 2	Corridor 2T	Corridor 3	Corridor 4	Corridor 5	Corridor 6	Corridor 7	Corridor 7T	Corridor 8	Corridor 9	Corridor 10
7. WATER USE AND RESOURCES - HIGH 10%													
TRAFFIC AND TRANSPORTATION	27%	7.43	7.15	4.53	11.56	13.37	24.98	20.55	18.09	15.25	16.88	15.93	10.28
NATURAL ENVIRONMENT	16%	11.60	10.35	13.02	8.22	10.05	10.89	9.61	9.64	13.68	7.59	8.01	12.43
CULTURAL ENVIRONMENT	9%	6.89	5.83	6.06	6.29	4.98	3.80	5.04	6.93	7.75	7.40	6.39	6.67
WATER USE AND RESOURCES	10%	3.85	2.87	10.00	2.47	2.04	0.67	6.96	6.96	10.00	7.78	8.60	8.80
SOCIO-ECONOMIC ENVIRONMENT	6%	0.24	0.17	0.14	2.14	2.13	5.25	5.35	4.13	4.01	4.12	3.63	1.54
LAND USE AND PROPERTY	8%	6.01	5.39	6.27	7.16	7.47	7.28	3.41	4.95	5.40	5.33	5.55	3.76
COSTS	24%	22.13	20.67	0.00	19.80	20.45	23.23	23.33	21.25	6.35	21.37	21.52	23.60
TOTAL	100%	58.15	52.43	40.02	57.64	60.50	76.09	74.26	71.95	62.44	70.47	69.63	67.07
RANKING		9	11	12	10	8	1	2	3	7	4	5	6
8. WATER USE AND RESOURCES - LOW 1%													
TRAFFIC AND TRANSPORTATION	30%	8.18	7.87	4.99	12.72	14.71	27.48	22.61	19.89	16.77	18.57	17.53	11.31
NATURAL ENVIRONMENT	18%	12.77	11.38	14.32	9.04	11.06	11.98	10.57	10.60	15.05	8.35	8.81	13.67
CULTURAL ENVIRONMENT	9%	7.58	6.42	6.67	6.91	5.48	4.18	5.55	7.62	8.52	8.14	7.03	7.34
WATER USE AND RESOURCES	1%	0.38	0.29	1.00	0.25	0.20	0.07	0.70	0.70	1.00	0.78	0.86	0.88
SOCIO-ECONOMIC ENVIRONMENT	7%	0.26	0.18	0.15	2.36	2.34	5.77	5.89	4.55	4.41	4.53	3.99	1.69
LAND USE AND PROPERTY	9%	6.62	5.93	6.90	7.87	8.21	8.00	3.76	5.45	5.94	5.86	6.10	4.13
COSTS	26%	24.34	22.74	0.00	21.78	22.50	25.55	25.66	23.37	6.98	23.51	23.68	25.95
TOTAL	100%	60.12	54.81	34.03	60.93	64.50	83.03	74.73	72.18	58.68	69.74	68.00	64.98
RANKING		9	11	12	8	7	1	2	3	10	4	5	6

Table 12
Sensitivity Test No. 9 and 10 Socio-Economic Environment - High and Low Tests

		Corridor 1	Corridor 2	Corridor 2T	Corridor 3	Corridor 4	Corridor 5	Corridor 6	Corridor 7	Corridor 7T	Corridor 8	Corridor 9	Corridor 10
9. SOCIO-ECONOMIC ENVIRONMENT - HIGH 15%													
TRAFFIC AND TRANSPORTATION	26%	7.19	6.92	4.39	11.19	12.94	24.17	19.89	17.50	14.75	16.34	15.42	9.95
NATURAL ENVIRONMENT	16%	11.23	10.01	12.60	7.95	9.73	10.53	9.30	9.32	13.24	7.35	7.75	12.03
CULTURAL ENVIRONMENT	8%	6.67	5.64	5.87	6.08	4.82	3.68	4.88	6.70	7.50	7.16	6.18	6.46
WATER USE AND RESOURCES	4%	1.59	1.19	4.14	1.02	0.85	0.28	2.88	2.88	4.14	3.22	3.56	3.64
SOCIO-ECONOMIC ENVIRONMENT	15%	0.55	0.39	0.32	5.00	4.97	12.24	12.49	9.64	9.35	9.61	8.47	3.59
LAND USE AND PROPERTY	7%	5.82	5.22	6.07	6.92	7.22	7.04	3.30	4.79	5.23	5.16	5.37	3.64
COSTS	23%	21.41	20.00	0.00	19.16	19.79	22.47	22.57	20.56	6.14	20.68	20.83	22.83
TOTAL	100%	54.46	49.37	33.38	57.33	60.31	80.41	75.31	71.40	60.35	69.51	67.57	62.13
RANKING		10	11	12	9	8	1	2	3	7	4	5	6
10. SOCIO-ECONOMIC ENVIRONMENT - LOW 1%													
TRAFFIC AND TRANSPORTATION	30%	8.38	8.06	5.11	13.03	15.07	28.16	23.16	20.38	17.18	19.03	17.95	11.58
NATURAL ENVIRONMENT	18%	13.08	11.66	14.67	9.26	11.33	12.27	10.83	10.86	15.41	8.55	9.02	14.01
CULTURAL ENVIRONMENT	10%	7.77	6.57	6.83	7.08	5.62	4.28	5.68	7.81	8.73	8.34	7.20	7.52
WATER USE AND RESOURCES	5%	1.86	1.38	4.82	1.19	0.99	0.32	3.36	3.36	4.82	3.75	4.15	4.24
SOCIO-ECONOMIC ENVIRONMENT	1%	0.04	0.03	0.02	0.33	0.33	0.82	0.83	0.64	0.62	0.64	0.56	0.24
LAND USE AND PROPERTY	9%	6.78	6.08	7.07	8.06	8.41	8.20	3.85	5.58	6.09	6.01	6.25	4.24
COSTS	27%	24.94	23.29	0.00	22.31	23.05	26.18	26.29	23.95	7.16	24.09	24.26	26.59
TOTAL	100%	62.83	57.08	38.53	61.28	64.79	80.22	74.00	72.58	60.02	70.40	69.40	68.42
RANKING		8	11	12	9	7	1	2	3	10	4	5	6

Table 13
Sensitivity Test No. 11 and 12 Land Use and Property - High and Low Tests

		Corridor 1	Corridor 2	Corridor 2T	Corridor 3	Corridor 4	Corridor 5	Corridor 6	Corridor 7	Corridor 7T	Corridor 8	Corridor 9	Corridor 10
11. LAND USE AND PROPERTY - HIGH 15%													
TRAFFIC AND TRANSPORTATION	26%	7.30	7.03	4.45	11.36	13.13	24.54	20.19	17.77	14.98	16.58	15.65	10.10
NATURAL ENVIRONMENT	16%	11.40	10.16	12.79	8.07	9.88	10.70	9.44	9.47	13.44	7.46	7.87	12.21
CULTURAL ENVIRONMENT	8%	6.77	5.73	5.95	6.17	4.89	3.73	4.95	6.80	7.61	7.27	6.28	6.56
WATER USE AND RESOURCES	4%	1.62	1.21	4.20	1.04	0.86	0.28	2.93	2.93	4.20	3.27	3.61	3.70
SOCIO-ECONOMIC ENVIRONMENT	6%	0.23	0.16	0.13	2.10	2.09	5.15	5.26	4.06	3.94	4.05	3.57	1.51
LAND USE AND PROPERTY	15%	11.64	10.44	12.14	13.85	14.45	14.08	6.61	9.59	10.46	10.32	10.74	7.27
COSTS	24%	21.74	20.30	0.00	19.45	20.09	22.82	22.91	20.87	6.24	21.00	21.14	23.18
TOTAL	100%	60.70	55.03	39.68	62.06	65.40	81.30	72.29	71.49	60.86	69.94	68.86	64.53
RANKING		10	11	12	8	6	1	2	3	9	4	5	7
12. LAND USE AND PROPERTY - LOW 1%													
TRAFFIC AND TRANSPORTATION	31%	8.51	8.18	5.19	13.23	15.30	28.59	23.52	20.69	17.44	19.32	18.23	11.76
NATURAL ENVIRONMENT	19%	13.28	11.84	14.89	9.40	11.50	12.46	11.00	11.03	15.65	8.69	9.16	14.22
CULTURAL ENVIRONMENT	10%	7.88	6.67	6.94	7.19	5.70	4.35	5.77	7.92	8.87	8.46	7.31	7.63
WATER USE AND RESOURCES	5%	1.88	1.41	4.90	1.21	1.00	0.33	3.41	3.41	4.90	3.81	4.21	4.31
SOCIO-ECONOMIC ENVIRONMENT	7%	0.27	0.19	0.16	2.45	2.44	6.00	6.12	4.73	4.59	4.71	4.15	1.76
LAND USE AND PROPERTY	1%	0.78	0.70	0.81	0.92	0.96	0.94	0.44	0.64	0.70	0.69	0.72	0.48
COSTS	27%	25.32	23.65	0.00	22.65	23.40	26.58	26.69	24.31	7.26	24.45	24.63	27.00
TOTAL	100%	57.91	52.64	32.88	57.07	60.30	79.23	76.94	72.73	59.40	70.13	68.41	67.17
RANKING		9	11	12	10	7	1	2	3	8	4	5	6

Table 14
Sensitivity Test No. 13 and 14 Costs – High and Low Tests

		Corridor 1	Corridor 2	Corridor 2T	Corridor 3	Corridor 4	Corridor 5	Corridor 6	Corridor 7	Corridor 7T	Corridor 8	Corridor 9	Corridor 10
13. COSTS - HIGH 50%													
TRAFFIC AND TRANSPORTATION	19%	5.29	5.09	3.23	8.23	9.51	17.78	14.63	12.87	10.85	12.02	11.34	7.31
NATURAL ENVIRONMENT	12%	8.26	7.36	9.26	5.85	7.15	7.75	6.84	6.86	9.73	5.40	5.70	8.85
CULTURAL ENVIRONMENT	6%	4.90	4.15	4.31	4.47	3.55	2.70	3.59	4.93	5.51	5.26	4.55	4.75
WATER USE AND RESOURCES	3%	1.17	0.87	3.05	0.75	0.62	0.20	2.12	2.12	3.05	2.37	2.62	2.68
SOCIO-ECONOMIC ENVIRONMENT	5%	0.17	0.12	0.10	1.52	1.52	3.73	3.81	2.94	2.85	2.93	2.58	1.09
LAND USE AND PROPERTY	6%	4.28	3.84	4.46	5.09	5.31	5.18	2.43	3.53	3.85	3.79	3.95	2.67
COSTS	50%	46.06	43.02	0.00	41.21	42.57	48.35	48.55	44.23	13.22	44.49	44.80	49.11
TOTAL	100%	70.13	64.46	24.41	67.14	70.24	85.70	81.96	77.47	49.06	76.26	75.54	76.47
RANKING		8	10	12	9	7	1	2	3	11	5	6	4
14. COSTS - LOW 10%													
TRAFFIC AND TRANSPORTATION	34%	9.52	9.16	5.81	14.81	17.13	32.01	26.33	23.17	19.53	21.63	20.41	13.17
NATURAL ENVIRONMENT	21%	14.87	13.25	16.68	10.53	12.88	13.95	12.31	12.34	17.52	9.72	10.26	15.92
CULTURAL ENVIRONMENT	11%	8.83	7.47	7.77	8.05	6.38	4.87	6.46	8.87	9.93	9.48	8.19	8.55
WATER USE AND RESOURCES	5%	2.11	1.57	5.48	1.36	1.12	0.37	3.82	3.82	5.48	4.26	4.71	4.82
SOCIO-ECONOMIC ENVIRONMENT	8%	0.30	0.21	0.18	2.74	2.73	6.72	6.86	5.30	5.14	5.28	4.65	1.97
LAND USE AND PROPERTY	10%	7.70	6.91	8.04	9.17	9.56	9.32	4.37	6.35	6.92	6.83	7.11	4.81
COSTS	10%	9.21	8.60	0.00	8.24	8.51	9.67	9.71	8.85	2.64	8.90	8.96	9.82
TOTAL	100%	52.54	47.19	43.94	54.91	58.32	76.90	69.86	68.69	67.16	66.09	64.29	59.07
RANKING		10	11	12	9	8	1	2	3	4	5	6	7

9.3.1 Summary of Sensitivity Testing

These sensitivity tests alone do not provide the justification for selecting a particular alternative. However, the testing supplied the Steering Committee with a tool to review the soundness of the decision-making process for the technical recommendation and provided a level of confidence in the selection.

The Study Team and Steering Committee concluded that the sensitivity testing exercise demonstrated that Corridor 5 was consistently the best balanced solution, considering a diverse range of perspectives, as indicated in **Table 15**, Summary of Sensitivity Tests.

Table 15
Summary of Sensitivity Tests

FACTORS	Corridor 1	Corridor 2	Corridor 2T	Corridor 3	Corridor 4	Corridor 5	Corridor 6	Corridor 7	Corridor 7T	Corridor 8	Corridor 9	Corridor 10
EVALUATION COMMITTEE	10	11	12	9	7	1	2	3	8	4	5	6
TRAFFIC AND TRANSPORTATION - HIGH 43%												
RANKING	10	11	12	9	6	1	2	3	8	4	5	7
TRAFFIC AND TRANSPORTATION - LOW 15%												
RANKING	8	11	12	9	7	1	2	3	10	4	6	5
NATURAL ENVIRONMENT - HIGH 45%												
RANKING	6	10	12	11	7	1	2	5	4	8	9	3
NATURAL ENVIRONMENT - LOW 7%												
RANKING	9	11	12	8	7	1	2	3	10	4	5	6
CULTURAL ENVIRONMENT - HIGH 22%												
RANKING	8	11	12	10	9	1	4	2	7	3	5	6
CULTURAL ENVIRONMENT - LOW 3%												
RANKING	10	11	12	8	7	1	2	3	9	4	5	6
WATER USE AND RESOURCES - HIGH 10%												
RANKING	9	11	12	10	8	1	2	3	7	4	5	6
WATER USE AND RESOURCES - LOW 1%												
RANKING	9	11	12	8	7	1	2	3	10	4	5	6
SOCIO-ECONOMIC ENVIRONMENT - HIGH 15%												
RANKING	10	11	12	9	8	1	2	3	7	4	5	6
SOCIO-ECONOMIC ENVIRONMENT - LOW 1%												
RANKING	8	11	12	9	7	1	2	3	10	4	5	6
LAND USE AND PROPERTY - HIGH 15%												
RANKING	10	11	12	8	6	1	2	3	9	4	5	7
LAND USE AND PROPERTY - LOW 1%												
RANKING	9	11	12	10	7	1	2	3	8	4	5	6

SUMMARY REPORT



FACTORS	Corridor 1	Corridor 2	Corridor 2T	Corridor 3	Corridor 4	Corridor 5	Corridor 6	Corridor 7	Corridor 7T	Corridor 8	Corridor 9	Corridor 10
COSTS - HIGH 50%												
RANKING	8	10	12	9	7	1	2	3	11	5	6	4
COSTS - LOW 10%												
RANKING	10	11	12	9	8	1	2	3	4	5	6	7
COSTS - 0%												
RANKING	11	12	10	9	7	1	3	4	2	5	6	8

9.4 ALTERNATIVE RANKING SUMMARY

The technical evaluation has identified a trade-off between the characteristics of the top two ranked alternatives (corridors 5 and 6 respectively) and those ranked third to fifth (corridors 7, 8, and 9 respectively). Corridors 5 and 6 would substantially improve transportation performance when compared to corridors 7, 8 and 9. Members of the public who attended PCS 4 and who live in close proximity to Corridor 5 believed that a more easterly corridor would have fewer effects on communities. The following points address their concerns.

1. Members of the Corridor 5 community questioned whether there was enough weight applied to community issues. The technical evaluation looked at a large number of sub-factors related to quality of life for people within the entire region, and this represented approximately 40 percent of all criteria evaluated. These sub-factors were spread amongst a number of evaluation factor groups. The evaluation concluded that Corridor 5 provided the best transportation performance, overall lower environmental effects, and reasonable cost.
2. Corridor 5 would allow traffic to disperse downstream of the crossing at more locations than other alternatives, thus minimizing the traffic remaining on the routes leading to or from the crossing. Doing so reduces effects such as noise, air-borne emissions, and community intrusion. Corridor 5 takes advantage of a Quebec transportation corridor that has been planned and protected for over 30 years for such an urban crossing. In fact, the City of Gatineau has made significant investment in rebuilding the roadway within the corridor. In Ontario, Corridor 5 utilizes a corridor owned by the NCC that has a very wide right of way, which results in very little direct physical impacts to any adjacent property. Corridor 6 is in close proximity to Corridor 5 and provides almost as good performance for transportation, but it rated significantly lower because of higher community impacts. It directly affects seventy-nine dwelling units and five businesses in Gatineau.
3. Corridors 7, 8, and 9 were closely ranked and have different characteristics from Corridor 5. Because they are farther from the urban core, these alternatives attract fewer trips and fewer commercial vehicles and would not support municipal and provincial land-use policies as well as Corridor 5 by the year 2031. Choosing corridors 7, 8, or 9 would result in greater pressure for urban sprawl and development in areas to the east, leading to longer trips and impacts on the regional transit system operation in order to support development. Greater environmental effects are associated with these crossings, which contain larger provincially significant wetlands and valued ecosystems. Although these three crossings have fewer community effects, there are adjacent communities at similar offsets to Corridor 5 in each of these other corridors. In addition, these three corridors cannot disperse traffic as efficiently as Corridor 5. All traffic leading to/from the crossing utilizes a small number of links. For example, in Ontario, the majority of trips would use Ottawa Road 174 to reach a crossing at corridors 7, 8, and 9.

4. Corridor 10 is the farthest from the urban core and did not serve traffic or truck destinations. The Evaluation Committee prioritized that this disbenefit higher than its good performance on cost.
5. West-end bridge alternatives (corridors 1, 2, 3 and 4) all rated below the east-end crossings. Although the community effects of Andrew Haden Park were considered, this was not the most significant reason for these alternatives ranking lower than Corridor 5. The lower traffic performance, the high cost of crossing Lac Deschênes, and effects on a large sailing area were trade-offs that rated them below Corridor 5. The technical analysis demonstrated that the west end will be a second priority to the initial project in the east.

Tunnel alternatives were rated at the low end of all the alternatives considered. This evaluation considered the magnitude of cost differences (between bridges and tunnels) versus the ability of the tunnels to reduce or eliminate most of the environmental effects. Including the tunnel alternatives in the evaluation resulted in Cost being allocated a large weight among factor groups. If the tunnel alternatives had not been on the list of alternatives, the Cost factor group would have been significantly less important and receive a lower weight.

A complete description of the analysis and evaluation methodology, the effects that were measured, and results of the technical evaluation are available in the technical appendix of the **Analysis and Evaluation Report, September 18, 2008**.

9.5 FINDINGS OF THE EVALUATION

The conclusions reached by the Study Team are as follows:

- The Kettle Island corridor demonstrated the highest score overall.
- It scored the highest for Transportation and Traffic sub-factors because the forecast traffic (car and truck) for this corridor is higher than any other crossing in the 2031 planning horizon. The study forecast that truck traffic diverted from the downtown area would be 1,800 vehicles/day in 2031 and represents a diversion of approximately 40 percent of all commercial vehicles from the Macdonald-Cartier Bridge and approximately one third of all truck traffic crossing on the three interprovincial bridges.
- It performed moderately well for Natural Environment sub-factors because the alignment generally follows existing roadways and the crossing over Kettle Island would be located at the tip of the island, to reduce the environmental footprint.
- It scored high for Land Use and Property sub-factors because this corridor generally follows existing transportation corridors. This is a corridor identified and protected in the City of Gatineau Official Plan. In Ottawa, this is an existing roadway with a wide right-of-way.
- It scored high for Socio-Economic sub-factors because it would have good performance for the movement of commercial goods.
- The projected cost for this corridor was moderate, compared to other competing options, with estimates at \$400-500 million (2008 dollars).

On the whole, the western alternatives did not rate as highly as eastern alternatives. Therefore, a western alternative is not recommended for implementation as the first project in the 20 year planning horizon. The Phase 2 EA will be initiated only for Corridor 5.

Although it continues to be desirable to identify a location for a future western crossing, none have been identified by this study for the following reasons:

- The implementation of a western crossing is expected to be at the end of or beyond the planning horizon of the Official Plans, and by this time traffic, population and employment forecasts are expected to change. These forecasts should be assessed at intervals over the next 5/10/15 years.
- As growth continues westerly, and is better defined, traffic demand for a crossing to the west of Lac Deschênes will increase. This demand should be monitored.
- Implementing the Kettle Island project will establish a new baseline for comparing future alternatives.

Following PCS 4, a number of individuals who live adjacent to Corridor 5 expressed concern about the effect of additional traffic directed to the Aviation Parkway. These comments have been reviewed. However, based on the advice from the Study Team specialists it continues to be the opinion of the technical experts that it is possible to mitigate or compensate for all effects within this corridor.

Corridor 5 demonstrates the best ability to meet the transportation objectives of the study, including minimizing all effects to the natural, social, and cultural environment.

To address public comments received at PCS 4, the Phase 2 work program will include tasks to investigate the concerns raised. The Phase 2 work program will review detailed data for noise, air quality, and traffic effects on the affected communities. The proposed technical work program will be reviewed by the public at PCS 5 (in Phase 2), during which the draft Study Design will also be presented to the public. Phase 2 of the EA will assess the preliminary design and investigate ways to minimize environmental effects and investigate opportunities for environmental enhancement for the Kettle Island crossing (Corridor 5).

10.0 CONCLUSIONS

10.1 STUDY CONCLUSIONS

In conclusion, the study team recommends Corridor 5 as the best balanced choice for a new crossing of the Ottawa River because it has a strong transportation performance, minimizes environmental effects and has a reasonable construction cost.

Corridor 5 requires little or no property acquisition in Ontario because it uses land already in the ownership of the NCC. Using the Aviation Parkway minimizes direct effects on nearby homes because the corridor is located within a wide right-of-way with large offsets to adjacent residential properties. In Quebec, this plan utilizes a corridor that has been planned and protected as well as a roadway that has been upgraded for over 30 years.

In Ontario, the link will continue to operate as the Aviation Parkway but will take advantage of the surplus roadway capacity. The roadway is currently capable of accommodating the forecast traffic demand without expanding the existing four-lane cross-section, except north of Montreal Road, where it is currently two lanes. In Quebec, the crossing will connect to Montée Paiement at Maloney Boulevard and utilize the recently upgraded arterial roadway northerly to Autoroute 50.

Although Corridor 5 rated highly when compared to other corridors, it does have effects on the natural, cultural, water use and resources and social environments. The findings of the evaluation were presented at PCS 4. Many issues and questions have been raised by the public and the Algonquin First Nation, described in Sections 6.4 and 7.0; these require further analysis to develop appropriate ways to address them. For example, in the segment between Montreal Road and the Ottawa River, there are a number of residential properties along the west side of the right-of-way that may be affected by the crossing. These will require closer examination to find an acceptable resolution.

Other effects that will be assessed in Phase 2 include:

- Noise associated with stop-and-go truck traffic at signalized intersections (grade separations will be investigated);
- Traffic intrusion by cutting through local neighbourhoods or by traffic congestion on aerial roadways;
- Impacts on fish habitat;
- Impacts on natural habitat, including the Kettle Island reserve;
- Potential First Nations areas of concern;
- Access to the Montfort Hospital, potential effects on the new MRI machine, and sound level changes to the Palliative Care Centre;
- Visual intrusion; and
- Loss of access to businesses on St. Laurent Boulevard with ramp closures on Highway 417.

10.2 ADDRESSING POLICY TARGETS

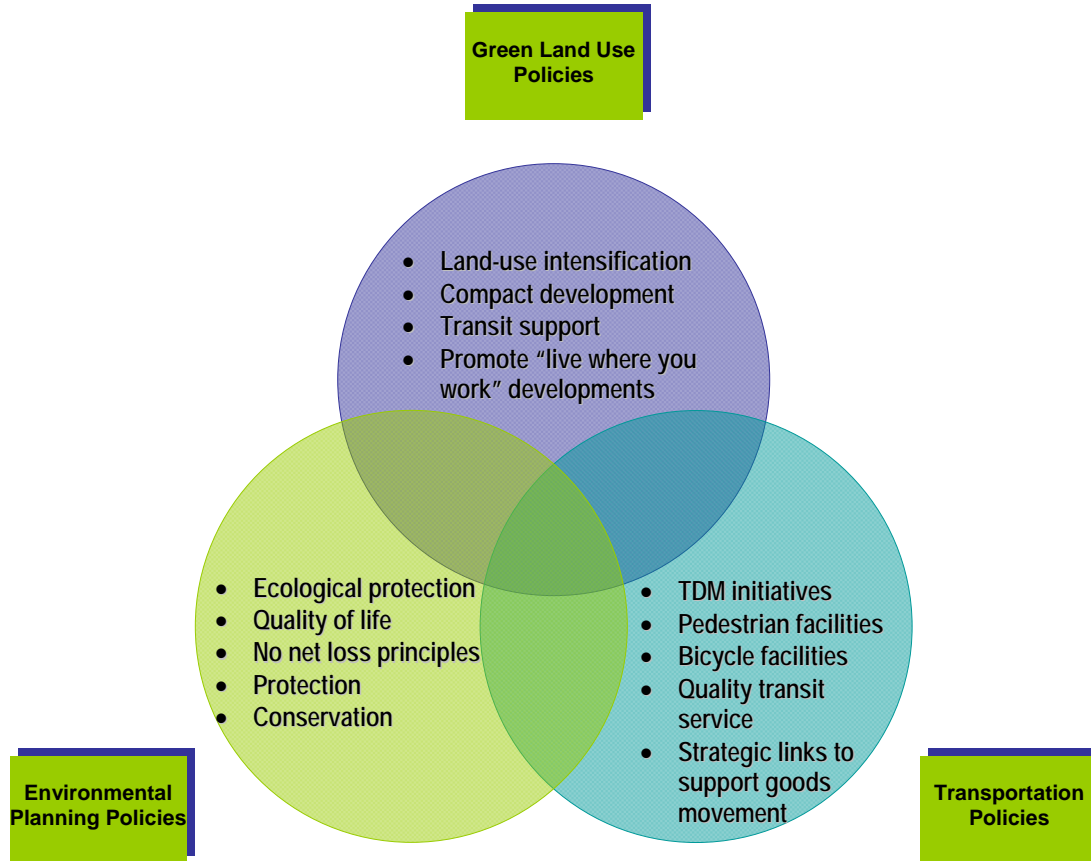
Ontario's Provincial Policy Statement (2005), and other Ontario land-use planning policies all support changing development patterns through intensification, compact development, protection of agricultural land from premature urban development, and the use of hard urban boundaries, as well as transportation demand management. Quebec has similar planning policies including those that prevent any further loss of agricultural lands.

A sustainable vision for the future NCR is recommended. This requires a balanced planning approach that takes into consideration integrated land use, transportation, and environmental policies as illustrated in Figure 25, Recommended Integrated Sustainable Planning.

The Official Plans reflect these principles of urban intensification. In fact, the Official Plans identify, as their highest to lowest priority, walking, cycling, transit and then strategic road links. The Official Plans described in this report reflect these principles by respecting existing walking and cycling links, recommending parallel interprovincial transit initiatives to achieve increased ridership, and minimizing future urban sprawl by locating the preferred corridor within the urban boundaries (inside the Greenbelt in Ottawa).

This study has measured the performance of 10 candidate crossing locations (and 12 possible alternatives) to attract traffic between Gatineau and Ottawa. To do this, the Study Team used a transportation model that measures compatibility with policies of the two cities – the Ottawa Official Plan urban intensification policies and Gatineau's targeted land development policy (which promotes urban intensification). Corridor 5, the Kettle Island crossing, performed better than any other crossing location on this evaluation. This criterion was measured under the transportation sub-group but is also a measure of community sustainability.

Figure 25
Recommended Integrated Sustainable Planning



10.3 STUDY ISSUES

The following significant issues were identified following the presentation of the Technically Preferred Alternative at PCS 4:

- No identification of a west-end crossing;
- Need for a ring road around Ottawa;
- Transit benefits;
- Land use intensification; and
- Effects on neighbourhoods.

Some of the most significant concerns and issues are summarized in **Table 16**.

Table 16
Concluding Study Issues

Identified Issue	Response / Action
Why has the study not identified a future west-end crossing location?	The need for a west-end crossing will continue as growth in the west continues. The need for a west-end crossing will require monitoring of growth and protection of the corridor locations.
Will a ring road concept be considered?	<p>Not at this time. The ring road concept was originally conceived as a southern provincial bypass around Ottawa to link existing freeways. The development of this concept has no status currently and would be subject to future studies should the need arise.</p> <p>The previous Interprovincial Concept Plan had recommended both east- and west-end crossings to provide a municipal looped network (or ring road) for trips within the urban area. Providing a looped system is desirable as it allows sharing of the roadway network capacity in both provinces.</p>

Identified Issue	Response / Action
Does the plan include transit?	<p>This study has recommended developing measures to increase transit ridership and alleviate traffic congestion. This initiative will be the subject of a separate study.</p> <p>Both improved transit and more roadways will be required to meet the mobility needs of future population and employment levels. The new crossing will also consider transit/HOV lanes in Phase 2 of the study.</p>
Does the Kettle Island crossing support the land-use intensification objectives of the provinces and municipalities?	<p>The Kettle Island crossing is the best alternative to support the goal of land-use intensification by locating the crossing in areas where population and employment growth to 2031 is recognized in the Official Plans. Crossings located further from the core have greater potential to promote urban sprawl and are not as conducive to the land-use objectives within the NCR.</p>
Have the First Nations been consulted?	<p>The Algonquin First Nations were contacted during Phase 1. Their input will continue to be sought in Phase 2. The Kitigan Zibi Anishinabeg First Nation at Maniwaki has identified a concern with rights and title to the islands in the Ottawa River. As greater certainty develops in the design of the proposed crossing, more specific dialogue will be undertaken.</p>

Identified Issue	Response / Action
<p>Should future growth be permitted in the NCR? If so, why is the Kettle Island corridor a good choice for a new crossing?</p>	<p>The challenge is how the NCR supports liveable communities in healthy environments. This growth is under municipal jurisdiction and approved in municipal Official Plans and will continue to occur. The goal is to choose a crossing that is consistent with the goals of the municipalities. The Kettle Island crossing is the preferred choice to achieve municipal growth management objectives because:</p> <ul style="list-style-type: none"> • it connects to existing arterial roadways; • it connects to an existing right-of-way owned by the public; • the Ontario linkage provides significant design flexibility because it is a wide right-of-way (this flexibility can include respecting a “parkway style” roadway as well as using available lands to mitigate effects by introducing elements such as landscape berms, depressed alignments, or grade separations); and • this route distributes traffic to a number of cross streets, therefore reducing the volume on any one street.
<p>Why can't the trucks simply be directed away from the city to a crossing not near communities?</p>	<p>The study assessed the possibility of attracting all of the trucks that currently cross the Macdonald-Cartier Bridge to a crossing farther from the downtown. Because the majority of commercial vehicles have origins and destinations close to the centre of the NCR (slightly east of the middle), this option is not possible. Crossings farther to the east of Kettle Island would not attract as many of these trucks. Should a change to available truck routes occur, (removing the Macdonald-Cartier Bridge) this would result in the majority of trucks moving to the Chaudière Bridge. The Kettle Island crossing would be the best option to handle such a potential change.</p>

Identified Issue	Response / Action
<p>Why are the federal and provincial governments addressing a municipal issue?</p>	<p>Sections 91 and 92 of the <i>Canadian Constitution Act, 1867</i> give legislative authority to the federal government over undertakings that connect a province to any other province. It is therefore a federal responsibility to plan these types of infrastructure projects. In doing so, the Government of Canada, through the federal EA process, can incorporate provincial considerations into the assessment of this type of project. The federal government, as a major employer in the NCR, has a policy of distributing employment on a 25% /75% basis between the cities of Gatineau and Ottawa respectively. As such, the government has a role to play in facilitating interprovincial mobility.</p>
<p>Will there be sound level impacts along the Kettle Island corridor?</p>	<p>Phase 2 of the study will assess potential changes in sound level in the area and investigate technically and economically feasible ways to minimize their effect..</p>
<p>Will there be air quality impacts along the Kettle Island crossing?</p>	<p>The Phase 1 work program has assessed all areas where there could be air quality issues. The Ontario Ministry of the Environment and Québec Ministère du Développement durable, de l'Environnement et des Parcs (MDDEP) have developed criteria for contaminants, including vehicle emissions that could harm human health. Canada-wide standards for particulate matter, (PM_{2.5}), have also been developed by Environment Canada. The Phase 1 air quality modelling of 2031 with the new crossing determined that levels for nitrogen oxide (NO_x), sulfur dioxide (SO_x) and carbon monoxide (CO) will be better than the provincial standards. The level of PM_{2.5} is better than the applicable standards. Phase 2 of the EA will assess air quality impacts and investigate ways to minimize effects.</p>

Identified Issue	Response / Action
<p>Will there be benefits to the downtown community?</p>	<p>Benefits to the downtown community are expected to result from this project including:</p> <ul style="list-style-type: none"> • reduced delays to persons crossing the Ottawa River; • reduced delays to goods movement, which will include removing approximately 40% of the commercial vehicles from the Macdonald-Cartier Bridge; • reduced noise and air-borne emissions and improved safety resulting in an improved quality of life; and • improved economic development and redevelopment.
<p>Can this project be subject to a Part II Order (bump-up) to Minister of Environment in the Province of Ontario to undergo an individual environmental assessment?</p>	<p>This project is subject to the <i>Canadian Environmental Assessment Act</i>. The portion of the project within the province of Ontario is contained within property owned by the federal government up to the Highway 174/417 interchange. However, all effects of the project, including other roadways, such as Highway 417 and Ottawa Road 174 will be considered part of the “Project” for which the EA will be undertaken. Therefore there will be no Ontario provincial bump-up opportunity.</p>
<p>What are the impacts on the water treatment facilities?</p>	<p>The water intake for the Gatineau area is located downstream of the Kettle Island Corridor. The possibility of water contamination from the crossing will be taken into consideration in Phase 2 to mitigate negative environmental effects.</p>

10.4 RECOMMENDED PLAN

- Based on the Phase 1 technical analyses the EA recommends:
- A 'basket' of solutions meet forecast growth of the community. This 'basket' of solutions contains initiatives which are beyond the scope of this Phase 2 EA and are being recommended to be carried out by others. The 'basket' of solutions includes:
- Interprovincial transit initiatives to increase ridership and increase transit mode share so that the majority of new trips will be accommodated by transit;
- Transportation demand management (TDM) measures to increase walking and cycling that include: sidewalks and bike lanes on the new crossing, investigation of other pedestrian and cycling facilities in the downtown such as the Prince of Wales Bridge;
- Transportation system management (TSM) measures to improve the efficiency of the existing infrastructure, such as making the best use of the Chaudière Bridge;
- Land-use polices to promote intensification and redevelopment strategies in the urban area;
- Future corridor protection by municipalities of lands that are currently under public ownership or protected under existing land-use designations to provide future flexibility for other crossings;
- Initiation of a commercial vehicle planning study to review interprovincial crossings and the ability to meet future forecast demand at this and other crossing locations and to improve overall goods movement in the NCR; and
- Continuation of the study to Phase 2 to assess in detail the Kettle Island Crossing as the Recommended Project.

10.5 RECOMMENDED PROJECT

The Kettle Island Corridor is recommended as the project for implementation in the next 20 years. Major features of the Recommended Plan include the following:

- Modified Highway 417/Ottawa Road 174 (split) interchange;
- Widen Aviation Parkway to a 4-lane divided cross-section;
- New intersection with the Rockcliffe Parkway;
- Long spans (approximately 200 m) over a navigational channel;
- New roadway link northerly from the bridge to Maloney Boulevard; and
- Widening of Montée Paiement over Autoroute 50 to a 4-lane structure.

Phase 2 of the study will assess the preliminary design and investigate ways to minimize environmental effects and investigate opportunities for environmental enhancement for Kettle Island Corridor 5.

The Recommended Plan is shown on **Figures 26 to 28**. Phase 2 is anticipated to be completed in approximately 36 months.

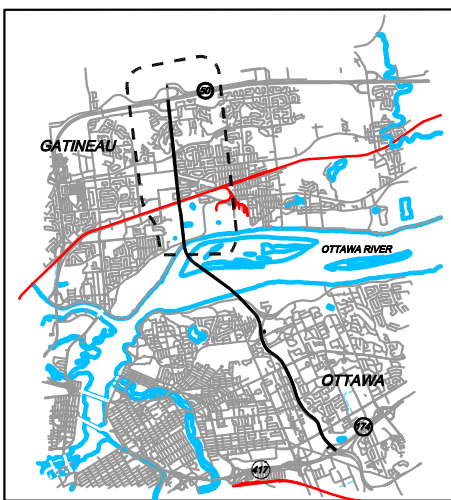
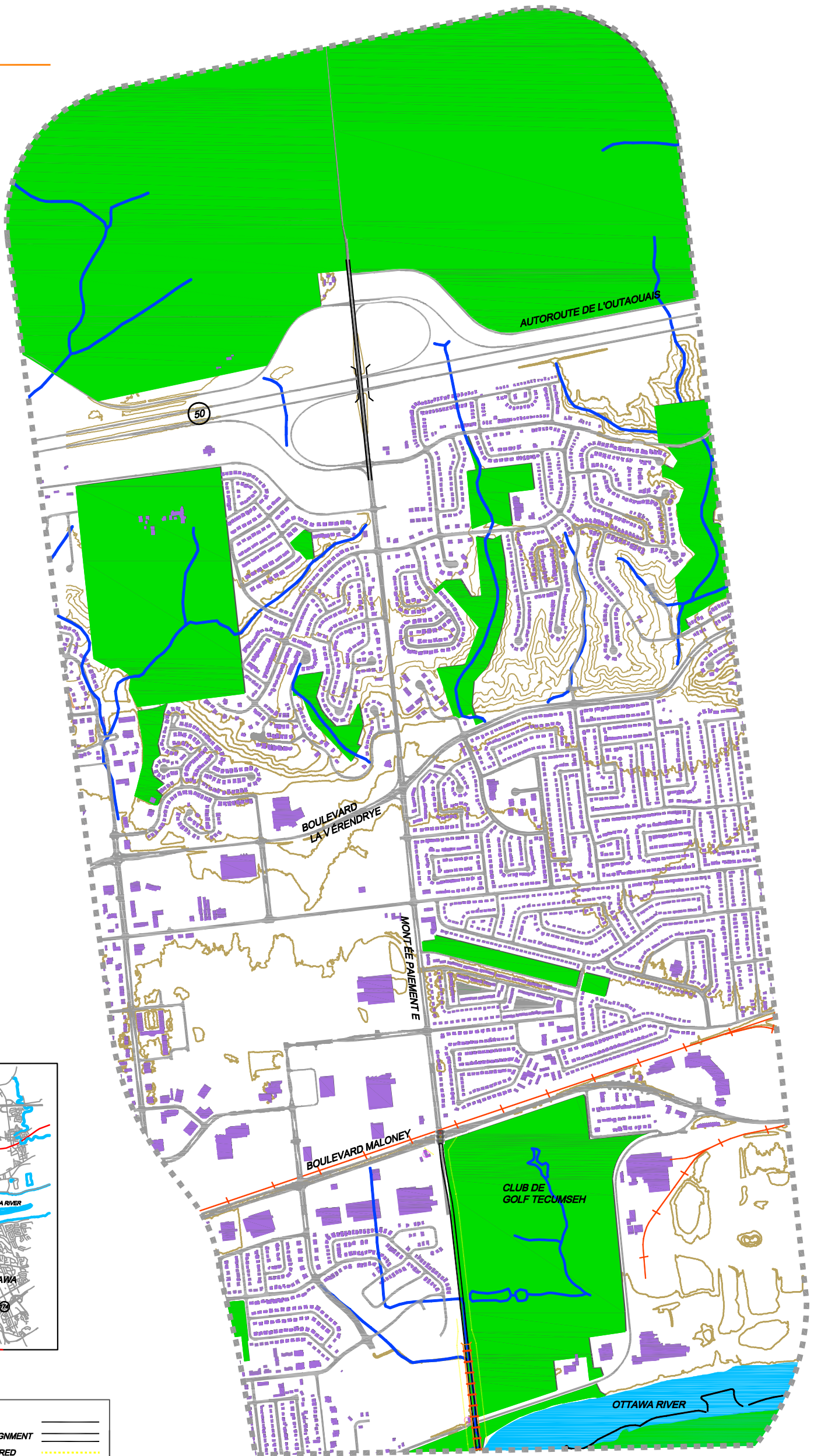
The changes that will result from the new crossing will lead to a more effective and efficient interprovincial roadway network. **Figure 29, Kettle Island 2031 a.m. Traffic Forecasts** and **Figure 30, Kettle Island 2031 Daily Commercial Vehicles** present the 2031 forecast of traffic that will be attracted to the new crossing (illustrated in red) and the locations from which this traffic is relocated (illustrated in green). **Figure 29** presents the a.m. traffic forecasts and **Figure 30** illustrates daily commercial vehicles. **Figure 31, Regional a.m. Peak Hour Traffic Distribution** and **Figure 32, Daily Commercial Vehicle Forecasts** present the Regional a.m. peak hour traffic distribution and daily commercial vehicle forecasts, respectively.

10.6 CANADIAN ENVIRONMENTAL ASSESSMENT ACT

This project will trigger a federal environmental assessment under the *Canadian Environmental Assessment Act* because:

- the recommendations cross a navigable water protected under the *Navigable Waters Protection Act*;
- it impacts fish habitat protected by the *Canadian Fisheries Act*;
- it will receive federal funding; and
- it requires federal lands.

Any of the above triggers will require a federal EA. Phase 2 of this EA will be carried out as a federal EA to provide clearance to meet federal, provincial and municipal legislative requirements.



KEY PLAN
N.T.S.

ILE KETTLE (50-417)

ROCHE NCE

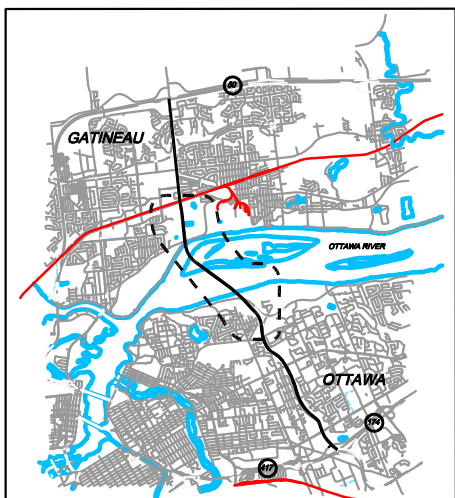
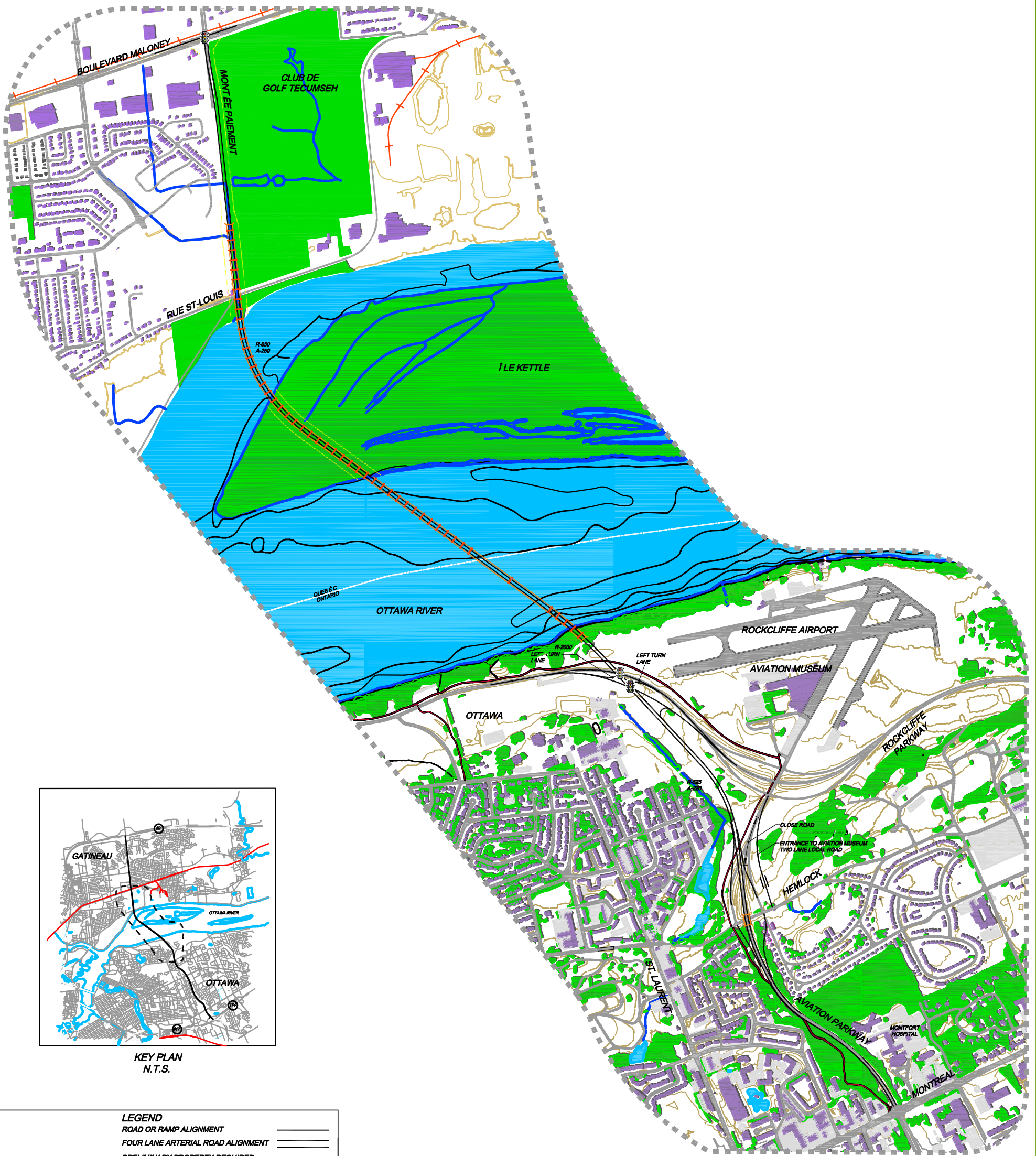
LEGEND

ROAD OR RAMP ALIGNMENT	
FOUR LANE ARTERIAL ROAD ALIGNMENT	
PRELIMINARY PROPERTY REQUIRED	
BRIDGE	
PRELIMINARY PROPERTY ACQUISITION	
AT GRADE SIGNALIZED INTERSECTION	

0 250m
0.5km

N.T.S.

FIGURE 26
KETTLE ISLAND (CORRIDOR 5)
TECHNICALLY PREFERRED ALTERNATIVE



KEY PLAN
N.T.S.

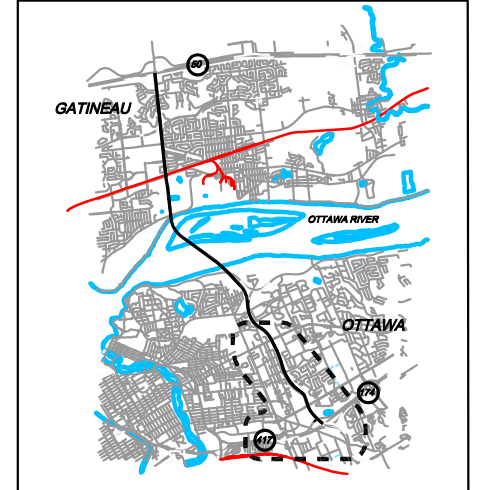
LEGEND

- ROAD OR RAMP ALIGNMENT
- FOUR LANE ARTERIAL ROAD ALIGNMENT
- PRELIMINARY PROPERTY REQUIRED
- BRIDGE
- PRELIMINARY PROPERTY ACQUISITION
- AT GRADE SIGNALIZED INTERSECTION

ÎLE KETTLE (50-417)

0 250m 500m
0.5km

N.T.S.



KEY PLAN
N.T.S.

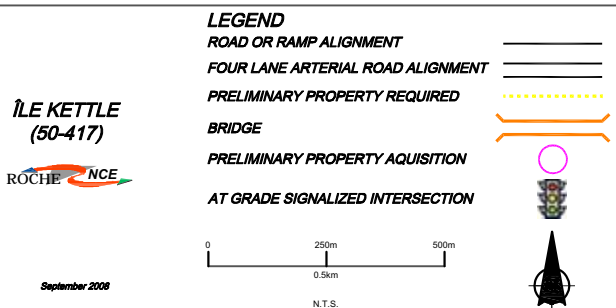


FIGURE 28
KETTLE ISLAND (CORRIDOR 5)
TECHNICALLY PREFERRED ALTERNATIVE

Figure 29
Kettle Island 2031 a.m. Differential Traffic Forecasts

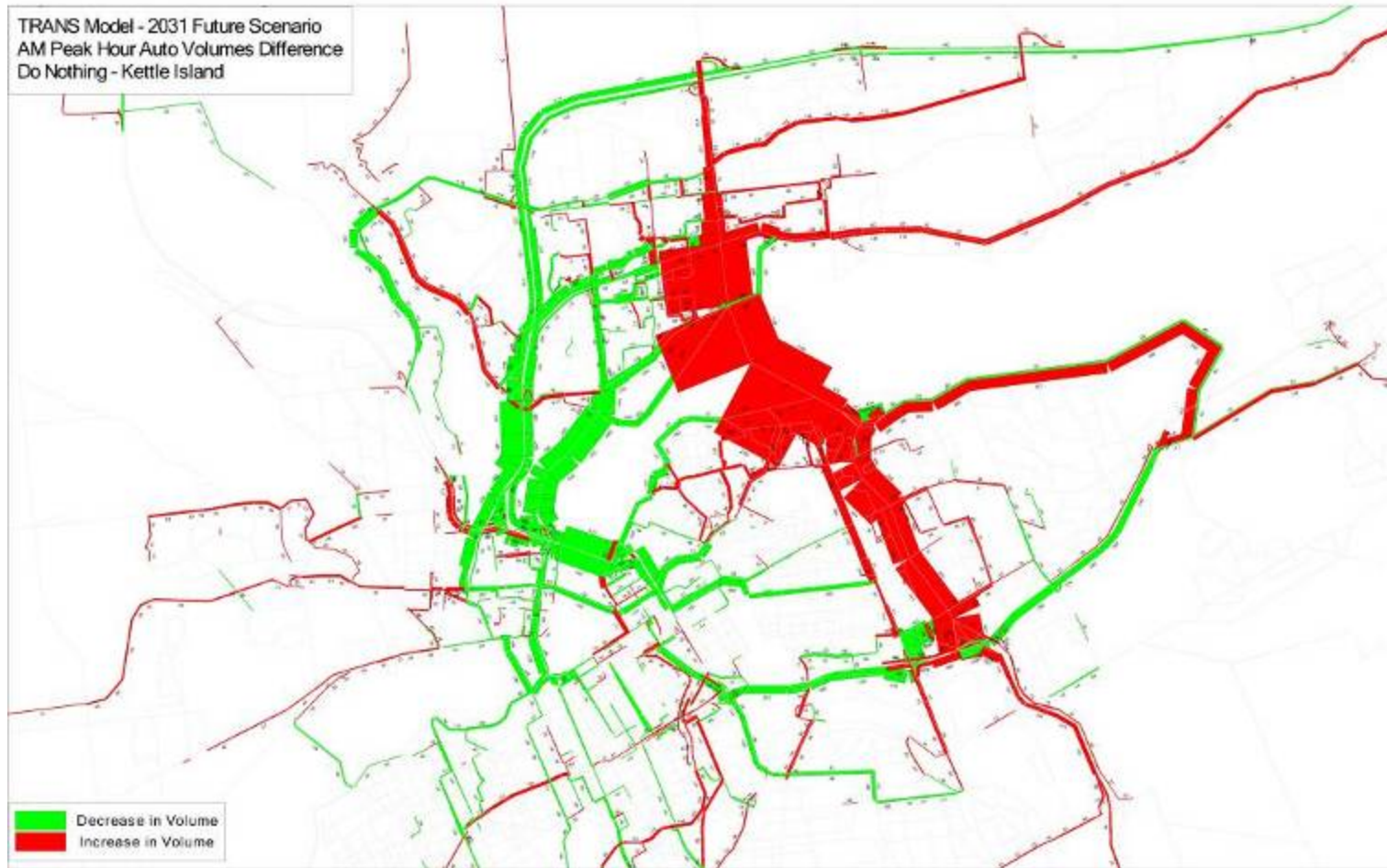


Figure 30
Kettle Island 2031 Daily Differential Commercial Vehicles

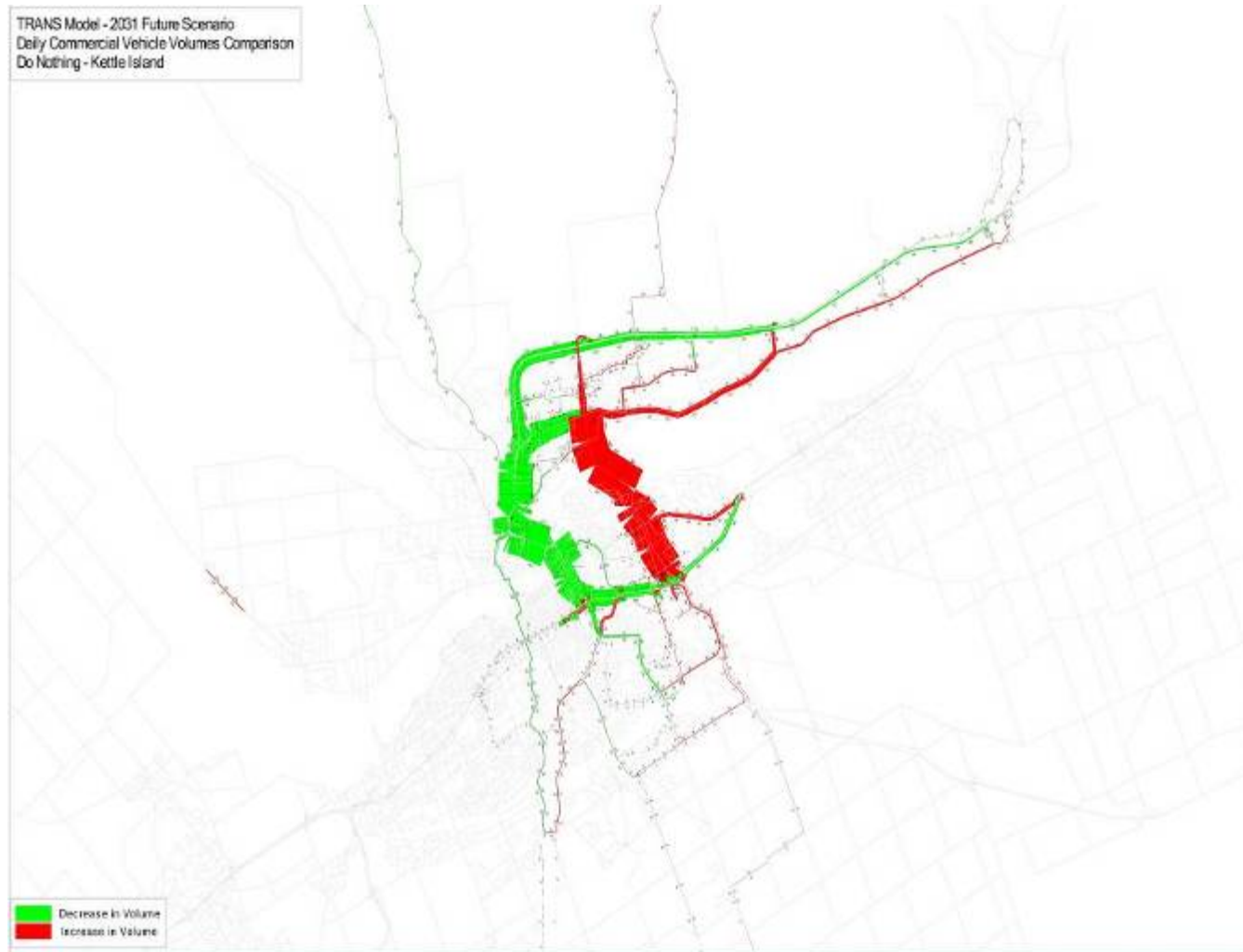


Figure 31
2031 Regional a.m. Peak Hour Traffic Distribution Forecasts

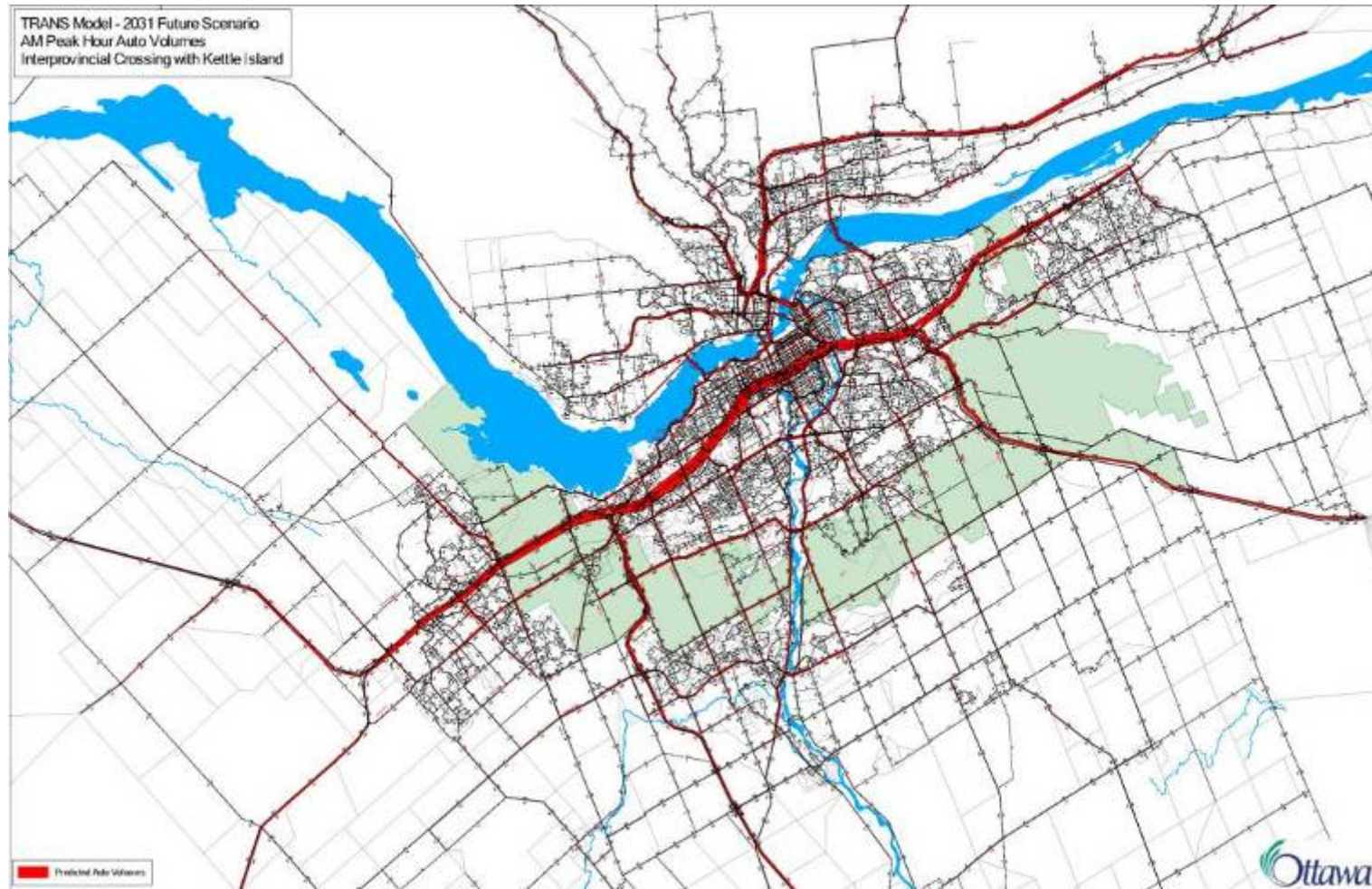
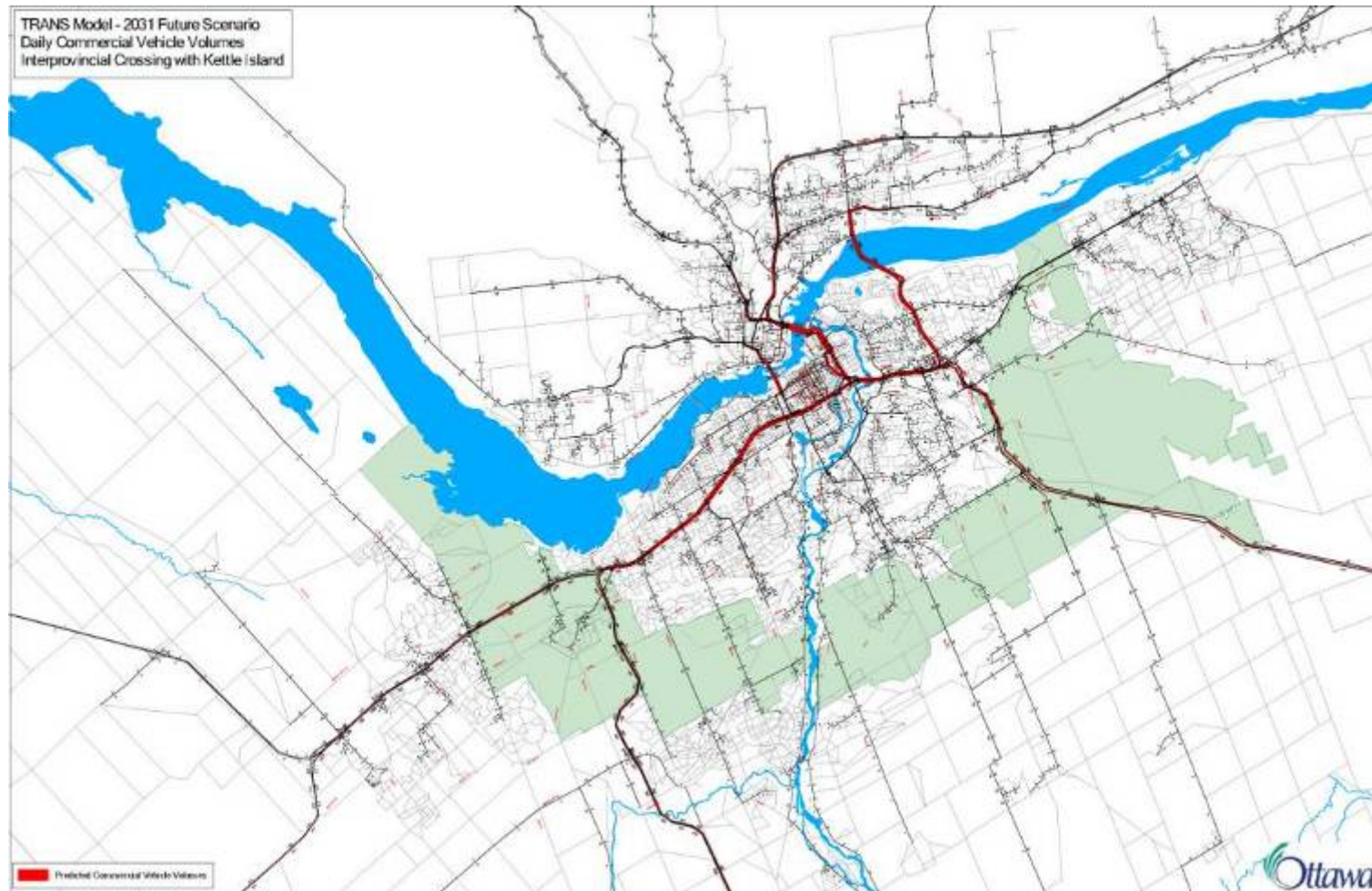


Figure 32
2031 Regional Daily Commercial Vehicle Distribution Forecasts



GLOSSARY OF TERMS

<i>Term</i>	<i>Description</i>
AADT	Refers to the annual average daily traffic and represents the average 24-hour, two-way traffic in a year (January 1 to December 31).
Alignment	The vertical and horizontal position of a road.
Alternative	A well-defined and distinct course of action that fulfils a given set of requirements. The Ontario <i>Environmental Assessment Act</i> distinguishes between “alternatives to the undertaking” and “alternative methods of carrying out the undertaking.”
Alternative Solutions	Alternative ways of solving problems or meeting demand (“alternatives to the undertaking”).
Alternative Designs	Alternative ways of solving a documented transportation deficiency or taking advantage of an opportunity. (Alternative methods of carrying out the undertaking).
ANSI	Area of natural or scientific interest.
BAPE	Bureau d’audiences publiques sur l’environnement.
Berm	Earth landform used to screen areas.
BMP	Best management practice.
BRT	Bus Rapid Transit.
Bump-Up	The act of requesting that a class EA, under the Ontario EA process, be required to follow the individual EA process. The change is a result of a decision by the proponent or by the Minister of Environment to require that an individual environmental assessment be conducted.
Bypass	A form of realignment in which the route is intended to go around a particular feature or collection of features.
Canadian Environmental Assessment Act (CEAA)	A federal statute that mandates the conduct of an environmental assessment for projects for which the federal government holds decision-making authority. It is legislation that identifies the responsibilities and procedures for the environmental assessment.
Compensation	The replacement of natural habitat lost through implementation of a project, where implementation techniques and other measures could not alleviate the effects.
Congestion	Demand exceeding capacity resulting in a poor level of service i.e., delays to drivers.
Corridor	A band of variable width between two locations. In transportation studies a corridor is defined area where a new or improved transportation facility might be located.
Criteria/Criterion	Feature(s) or consideration(s) used for comparison of alternatives.

<i>Term</i>	<i>Description</i>
Culturally Sensitive Areas (CSA's)	The areas identified by any agency or level of government which contain cultural, historical, or visual amenities that are susceptible to disturbance from human activities and which warrant protection.
Cumulative Effects	Combined effects that may result from other past, present, and future projects and activities.
CUO	Community Urban d'Outaouais.
dBA	A-weighted decibels, a measure of sound levels as heard by the human ear.
Decibel (dB)	A logarithmic unit of measure used for expressing level of sound.
Detail Design	The final stage in the design process in which the engineering and environmental components of preliminary design are refined and details concerning, for example, property, drainage, utility relocations and quantity estimates are prepared, and contract documents and drawings are produced.
DFO	Department of Fisheries and Oceans.
EA	Environmental assessment.
Ontario EA Act (OEAA)	<i>Environmental Assessment Act</i> (as amended by S.O. 1996 C.27), RSO 1980.
Environment	Air, land or water. Plant and animal life, including human life. Human communities. The social, economic and cultural conditions that influence the life of humans or a community. Any building structure, machine or other device or thing made by humans. Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from the human activities. Any part or combination of the above and the interrelationships between any two or more of them.
Environmental Assessment	A study that assesses the potential environmental effects and benefits of a proposal.
Environmental Effect	A change in the existing conditions of the environment which may have a beneficial (positive) or detrimental (negative) effects.
Equivalent Sound Level (Leq)	The level of a continuous sound having the same energy as a fluctuating sound in a given time period. Leq refers to 24-hour averages.
Evaluation	The outcome of a process that appraises the advantages and disadvantages of alternatives.
Evaluation Process	The process involving the identification of criteria; rating of predicted impacts; assignment of weights to criteria; and aggregation of weights, rates, and criteria to produce an ordering of alternatives.
External Agencies	Include federal departments and agencies, provincial ministries and agencies, conservation authorities, municipalities, crown corporations, or other agencies.

<i>Term</i>	<i>Description</i>
Factor	A category (broken down into sub-factors).
Flyover	A grade separation with the side road over the freeway. Also described as an underpass.
Freeway	Freeways are controlled access median divided highways with grade separated crossings and interchanges (i.e., Highway 417).
Grade Separation	The separation of a cross road with a vertical grade difference from the freeway. Also see overpass, underpass, or flyover.
HADD	Harmful alteration, disturbance, or destruction of fish habitat.
Harmonized EA Process	Harmonized planning process for this project that will meet both the provincial and federal EA requirements.
HOV	High occupancy vehicle – Usually used to describe a lane carrying vehicles carrying more than two or three people.
Individual Environmental Assessment	An environmental assessment for an undertaking to which the OEAA applies and which requires formal review and approval under the Act.
Interchange	The intersection between two roadways at different levels with connecting ramps for traffic turning between them.
JACPAT	Joint Administrative Committee on Planning and Transportation.
JV	Joint venture.
LOS	Level of service; a measure of the quality of operation of a transportation facility such as an intersection, arterial roadway, freeway, or ramp. The indicators are expressed as a value ranging from LOS “A” for an excellent level of service (i.e., minimal delays and a high level of mobility) to LOS “F” for breakdown conditions (i.e., very length delays and severely restricted mobility). The target LOS for most roadways in the NCR is LOS “D”.
LRT	Light rail transit.
LUP	Land-use plan (Schéma d’aménagement).
MATS	The Multiple Attribute Tradeoff System.
MDDEP	Ministère du Développement durable, de l’Environnement et des Parcs
Mitigating Measure	A measure that is incorporated into a project to reduce, eliminate, or control adverse environmental effects.
Mitigation	Action that either reduces, eliminates or controls the negative impacts associated with the implementation of an undertaking.
MNR	Ontario’s Ministry of Natural Resources.
Mode Share	The division of travel demand between vehicles, transit, pedestrians and cyclists.
Mode Split	The division of motorized car trips i.e., car versus transit.
MOE	Ontario’s Ministry of the Environment.
MTO	Ministry of Transportation of Ontario.

<i>Term</i>	<i>Description</i>
MTQ	Ministry of Transportation of Québec.
Natural Environment Areas (NEA's)	Those areas identified by any agency or level of government that contain natural features and ecological functions that are susceptible to disturbance from human activities and warrant protection.
NCC	National Capital Commission.
NCR	National Capital Region, which includes the City of Ottawa, Ville de Gatineau and areas immediately adjacent to these two urban centres.
Noise Attenuation	A mitigation measure used to lessen the intensity of the sound level) where the noise level is increased in a noise sensitive area greater than 5 dBA 10 years after completion.
NSA	Noise-sensitive area; an outdoor living area associated with the residential unit.
OC Transpo	Ottawa Transit Services
OD'05	Origin Destination Survey 2005 by TRANS Committee
OLA	Outdoor living area.
Overpass	Cross road that goes over a highway.
PCG	Public Consultation Group.
PCS	Public Consultation Session.
Planning Alternatives	Planning alternatives are "alternative methods" under the Ontario EA Act. These identify transportation engineering opportunities while protecting significant environmental features as much as possible.
Planning Solutions	That part of the planning and design process where alternatives to the undertaking are identified and assessed.
Prime Agricultural Areas	Prime agricultural areas as defined in municipal official plans and other government policy sources.
Project	A specific undertaking planned and implemented in accordance with this Class EA, including all those activities necessary to solve a specific transportation problem.
Project Notice	A requirement of the Province of Quebec by the MDDEP. Every person wishing to undertake the realization of any of the projects contemplated in section 3.1.1 must file a written notice with the Minister describing the general nature of this project. The Minister in turn, shall indicate to the proponent of the project the nature, the scope and the extent of the environmental impact assessment statement that he must prepare.
Proponent	A person or agency that carries or proposes to carry out an undertaking, or is the owner or person having charge, management, or control of an undertaking.
Public	Includes the general public, interest groups, associations, community groups, and individuals, including property owners.
RAPIBUS	Rapid Transit Bus system under jurisdiction of STO. Also see OC Transpo.

<i>Term</i>	<i>Description</i>
Realignment	Replacement or upgrading of an existing roadway on a new or revised alignment.
Recommended Plan	The recommended plan comprises of a basket of solutions that are carried forward to address the identified problem. This list of alternative strategies may include a preferred design solution (Technically Preferred Alternative) that provides definition of the undertaking.
Reconnaissance Assessment	Review of existing knowledge supplemented by on-site examination to provide the qualitative understanding of natural environment features and functions required for the rating of route alternatives.
Route Alternatives	Location alternatives within a corridor.
RVCA	Rideau Valley Conservation Authority.
SADT	Summer average daily traffic - the average 24-hour, two-way traffic for the period from July 1 to August 31 including weekends.
Screening	Process of eliminating alternatives, which do not meet minimum conditions or categorical requirements, from further consideration. Note that this is not the definition under the CEAA.
Screenline	An imaginary line over which transportation facilities cross. Used for the purpose of analyzing overall Level of Service by comparing actual volumes or people, to capacity.
Study Commencement Notice	A requirement of the province of Ontario at the initiation of planning activities to notify the public of their opportunity to participate.
Sub-factor	A single criterion used for the evaluation. Each sub-factor is grouped under one of the factors.
TAC	Technical Advisory Committee.
Technically Preferred Alternative	The preferred design solution which is proposed to be carried forward as the undertaking.
ToR	Terms of Reference.
Traceability	Characteristics of an evaluation process which enables its development and implementation to be followed with ease.
TRANS Committee	A committee established in 1979 to co-ordinate efforts between the major transportation planning agencies of the NCR. The committee is a neutral forum for the exchange of information on technical guidelines and best practices. In addition, it manages transportation studies and collects data for transportation planning.
Transitway	Dedicated Rapid Transit busway. Also see RAPIBUS
Underpass	Cross road that goes under a highway.
Undertaking	A project or activity subject to the Ontario <i>Environmental Assessment Act</i> .